



FRIDAY, SEPTEMBER 21, 1894.

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Notes on German Railroad Practice—Construction, Maintenance of Way, General and Traffic Statistics.*

BY MR. E. M. HERR.

The railroads of the German Empire were not built to develop a new country as most of those in the United States were, but to serve and accommodate an already dense population. The construction was from the start much more permanent in character, elaborate and costly than the original construction of most American lines. Heavy and expensive construction work was done originally to avoid serious grades and sharp curves, which in American practice would not have been undertaken until the traffic had been developed to a point where earnings could make reasonable returns on the additional capital required. The subway, comprising all embankments, cuts, bridges, culverts, foundations, retaining walls, etc., of the German railroads, is well constructed and cared for. The embankments are wide enough to hold the ballast, which is generally gravel, but sometimes of broken stone. The amount of ballast used differs greatly, being very ample on the principal lines and rather deficient on the less important branches, but all track is ballasted with more or less of gravel, stone or cinders. The width of the top of the ballast varies on single track from 7½ ft. to 13 ft., averaging about 10 ft. On double track the top of the ballast is from 21¼ to 27¼ ft. wide, averaging 23 ft. The thickness of the ballast, measured from the top of its surface, i. e., the bottom of the rail, varies from about 4 to 31½ inches and averages about 13½ inches.

The average cost of the ballast used during the year 1892 on German lines was 61½ cents per cubic yard. Both wood and metal ties are used. The use of steel ties is increasing owing to the high and rising price of good hard wood ties. Of all the wood ties in use, but 52½ per cent. are hard wood, mostly oak, the other 47½ per cent. being pine, fir, spruce, etc. Ties are not spaced as closely on German roads as in American practice. The average number of wooden ties per mile of track in 1892 was 1,787, and of metal ties 1,811. The use of zinc chloride for preserving ties has increased rapidly, until at the present time practically all new ties are treated before being placed in the track. In 1892 nearly 35 per cent. of all the oak ties in the track and about 20 per cent. of all kinds of wood ties in use had been impregnated. The total number of metal ties in use on German roads in 1892 was 14,531,617, which is almost 20 per cent. of all the ties in the track at that time. The average cost of wood ties is so high and that of metal ties so low that it is not strange that the use of metal ties is already large and rapidly increasing. The average cost of wood ties during year 1892, on all German lines, was \$1.14 each, while the cost of metal ties weighing 109 lbs. each, during the same year, was \$1.70. The rail used is nearly all of the common T section and averages slightly over 67 lbs. per yard. The average cost during year 1892 was \$34.38 per ton. The rails are usually spiked direct to the ties and joined with angle bars drilled for four bolts. The joints are usually suspended and quite commonly low, making the track ride hard. The hard riding is, however, much aggravated by the cars, which have but one long semi-elliptic spring over each journal and ride much harder than American cars. Nevertheless the refinements of track maintenance, surfacing and curve alignment are not met with even in the best German practice to the extent common on our principal lines. The average cost of material and labor for repairs and maintenance of rails and rail fastenings, ties, crossings, switches, frogs and ballast for all German lines in 1892, per mile of line was \$533.50; per 1,000 locomotive miles, \$71.25. The average cost of maintenance and repairs to track, roadbed, stations, yards, signals, telegraph and all other parts of

the permanent way, and buildings, including bridges, tunnels, workmen's houses and all shop buildings except round houses and coal sheds and chutes, was, during the year 1892, per mile of line, \$1,575; ditto per mile of track, \$916; ditto per 1,000 locomotive miles, \$122.17; ditto per 1,000 car axle miles, (all kinds), \$4.84.

The record of rail breakages during the year 1892 shows a total of 7,368 broken rails of all kinds, of which 6,638 were steel. This amounts to 9 broken rails for every 10,000,000 car axle miles, or 0.274 broken rails per each mile of track. With this large number of rail breakages, so thoroughly is the track policed and inspected, that there were only five accidents during that year attributable to this cause.

Almost the entire railroad system of the German Empire is under government direction, over 90 per cent. being owned absolutely by the general government and less than 10 per cent. is owned and operated by private corporations. The management is careful, conservative and in general serves well the needs and requirements of the people.

The following general statistics show the length of all German railroads, also the proportion of railways to the number of square miles of area, and to the number of inhabitants of the country in 1892:

PRINCIPAL LINES:		Miles
Government railroads.....	18,012	
Private railroads under Government control.....	3	
Private control.....	1,492	
SECONDARY LINES:		Miles
Government railroads.....	5,706	
Private railroads under Government control.....	55	
Private control.....	939	
Total miles all railroads, 1892.....	26,207	
Total length of double or more track line.....	8,282	
Area of the German Empire.....	207,770 square miles	
Number of inhabitants.....	49,766,600	
Miles of railroad per 100 square miles of area.....	12.6	
Miles of railroad per 10,000 inhabitants	5.26	

In order to compare as nearly as possible the German with American railroad practice, the statistics compiled by the United States Inter-State Commerce Commission for the year 1892 in groups 2* and 3† of the United States, are below set opposite the same statistics for the German lines during the same period of time.

COMPARISON OF AVERAGE OPERATING AND GENERAL EXPENSE OF GROUPS II. AND III. UNITED STATES RAILROADS, AND ALL RAILROADS OF THE GERMAN EMPIRE DURING YEAR 1892.

	Group II.	Group III.	German Lines.
Total length of track in miles....	18,668	21,935	26,207
Maintenance of way and structures per mile.....	\$2,015.24	\$1,575.34	\$2,109.33
Maintenance of equipment and conducting transportation per mile.....	7,526.37	5,601.13	5,233.06
General expenses per mile.....	1,034.13	808.03	743.15
Per cent of operating expense to income.....	65.36	70.43	63.28

COMPARISON OF EQUIPMENT AND TRAFFIC OF GROUPS II. AND III. OF UNITED STATES RAILROADS, AND ALL RAILROADS OF THE GERMAN EMPIRE DURING YEAR 1892.

	Group II.	Group III.	German Lines.
Number of locomotives per 100 miles of line.....	46	25	55.3
Number of cars in passenger service per 100 miles of line.....	45	18	138
Average number of passengers carried per mile of line.....	11,479	3,088	13,822
Number of cars in freight service per 100 miles of line.....	1,986	1,042	1,114
Average number of tons freight carried per mile of line.....	13,619	6,868	9,892
Freight cars per 1,000,000 tons of freight carried.....	1,460	1,515	1,243
Proportion of total earnings from passenger traffic.....	23.87 p.c.	23.72 p.c.	27.41 p.c.
Proportion of total earnings from freight traffic.....	69.74 p.c.	69.28 p.c.	67.67 p.c.
Proportion of total earnings from other sources.....	6.39 p.c.	7 p.c.	4.92 p.c.

German passenger traffic is divided into four classes besides the military, each of which has a special tariff, is handled in different cars, or at least in different parts of the same car, and is accounted for separately from the others. As this practice is decidedly different from that of any American line, the analysis of the passenger traffic of the German roads given below will be of interest.

ANALYSIS OF PASSENGER TRAFFIC, GERMAN RAILROADS, YEAR 1891-92.

	First Class.	Second Class.	Third Class.	Fourth Class.	Military.	All Classes.
Revenue of in per cent. of total passenger revenue.....	4.48 p. c.	26.05 p. c.	48.39 p. c.	18.4 p. c.	2.68 p. c.	....
Average revenue from each passenger, dollars.....	\$1.778	\$0.4875	\$0.1525	\$0.135	\$0.16	....
Average revenue from each passenger, per mile.....	0.0318	0.204	0.0122	0.008	0.006	\$0.0123
Proportion of all passengers carried in each class.....	0.49 p. c.	60.13 p. c.	60.74 p. c.	25.59 p. c.	3.05 p. c.	....
Average number of miles each passenger is carried.....	55.79	24	12.5	16.93	25.49	....
Average proportion of total available seats occupied in each class.....	8.29 p. c.	18.76 p. c.	24.1 p. c.	33.55 p. c.	....	24.15 p. c.

In express service each passenger is carried an average distance of 72.36 miles, and in accommodation trains an average of only 14.17 miles. The average revenue from each passenger mile on the railroads comprising Group II and Group III, of United States roads during the year

1892, was \$0.0187 and \$0.02133 respectively, while the cost of each passenger mile was for these two groups \$0.01648 and \$0.01969 respectively.

The proportion of passenger, baggage and freight cars actually utilized on the average on the German railroads during the year 1891-92 was as follows: Passenger cars, 23.08 per cent.; baggage cars, 2.16 per cent. freight cars, loaded, 72.25 per cent.; all freight cars, both loaded and empty, 47.01 per cent.

No attempt has been made in the series of notes on German railroad practice, of which this is the last, to elaborate or enlarge upon the data collected by the writer during a somewhat extended but rather hurried investigation of the equipment and methods of the German railroads. These notes would, however, be incomplete were no mention made of the very noticeable results of the careful, systematic and thorough study which the German railroad engineers and managers have made in recent years of the business of railroading in all countries, but more especially in the United States. One sees everywhere substantial evidence of the completeness of their investigations into American practice, and of the care and skill with which they are adapting to their use the American methods and devices best suited to the needs of their service.

The Roadmasters' Convention.

(Concluded from page 631.)

We continue our report of the 12th annual convention of the Roadmasters' Association of America. On Wednesday morning the discussion on track joints was resumed.

Mr. Ward, who was chairman of the committee on track joints last year, said that he had found that joints which were presented to the committee for tests were in some cases only models and were not fit for testing, and that joints which were presented to a committee one year were entirely different from those presented in previous years, that is, the form of the joint was altered so that it was impossible for the committee to note what improvements were made in the joints from year to year. He further said that he had been blamed for his criticism of various joints in the report of the committee of which he was chairman. In his report last year he stated that the Heath joint possessed some good points, but that it was not well constructed mechanically. This criticism has borne some good fruit as he has noticed that the joint now offered is better constructed than the joint offered last year.

The report was disposed of by adopting the following resolution: "That the report on track joints be received as information and recommitment, and that the said committee be discharged and that the Executive Committee shall appoint a permanent committee on track joints, which shall continue tests and gather reports and such other information in regard to the cost per ton for maintaining every joint reported on by the committee, and that the committee be instructed to report each year on the improvements in joints and to submit samples of the various joints actually tested and reported upon."

The next report taken up for discussion was on track tools [Abstract in Railroad Gazette, September 14, p. 630]. This report was adopted in sections. It was suggested that the handle of the tamping bar be increased from ¾ to 1 or 1½ inch, but this suggestion was laid on the table. The report was then adopted as read.

At the afternoon session the report on ties was taken up for discussion. [Abstract on page 630.] The last two sections caused the most discussion. Several members did not hold the same opinion as that of the committee, that timber cut between January 1 and August 1 was less durable than timber cut between August and January. Mr. Ward thought that ties cut from young medium-sized sticks with the heart in the center added about 25 per cent. to the life of the tie, and for these ties he usually paid 5 cents more, and that yellow pine should not be cut between January and June. Another member thought that the best results were to be obtained from yellow pine cut between October 1 and March 1. Mr. Sharpe said that experiments were made on his road, the S., F. & W., and are still being made, and that the best results were obtained from timber cut in June. One member thought that the best results were to be obtained by cutting the timber in mid-winter. Another member cut his ties between December 15 and February 15, and June 15 and August 15. Those which were cut between June and August he did not put in the track until the following March.

The following substitute offered by Mr. Jones was

adopted in place of the paragraph stating the best time for cutting ties. "Experiments show that timber cut when the sap is up is very much less durable than when the sap is down." The following motion offered by W. W. Sharpe was adopted: "Resolved, that the report be accepted as in-

*For other articles in this series see pages 544, 559 and 605.

* N. Y., Pa., N. J., Del., Md.

† Ohio, Mich., Ind.

formation and that a permanent committee be appointed to find out the best month for cutting ties, and any information about the best methods of preserving ties, no artificial methods to be used in preserving them." The following motions were also adopted: "That a committee be appointed to investigate the best methods of preserving ties by creosoting, tie-plates or any artificial method:

"That the President and the Secretary be authorized and instructed to provide for the storage and care at the permanent office, of the models of standard track tools adopted by the Association, also to provide blue-prints of the models, the models to be held for free examination by anyone wishing to duplicate the same, and the blue prints be furnished free on application to the Secretary;

"That we favor a joint fastening with the joint supported by a tie or by a truss of some description, and believe that improvements in joint fastenings should be sought for in this direction;

"That the Secretary and Treasurer send to each member, by August 15 of each year, a copy of all reports that may be in his hands at that time. To accomplish this it will be necessary that the committees have their reports in the hands of the Secretary by August 1."

Mr. Robert Black (Manhattan Elevated) read a short paper on the result of the use of tie-plates on his road. He said that he had in use about half-a-million tie-plates and that he was placing them in the tracks as fast as possible. He has found that the rails are kept better in line than without them.

A vote of thanks was extended to the Verona Tool Works for making the models of the different track tools adopted, to Col. F. K. Hain, to Mr. Rollin H. Wilbur of the Lehigh Valley, and to Mr. John H. Starin. The convention then adjourned. The next annual convention will be held in St. Louis, Mo., on the second Tuesday in October.

At a meeting of the Executive Committee held later the prize offered by the *Railway Age*, for the best essay on "The Best Methods and Appliances for Clearing Wrecks," was awarded to J. C. Hutchins of the Yazoo & Mississippi Valley, who received the first prize of \$125, and J. M. Meade, of the Atchison, Topeka & Santa Fé, who received second prize.

The rest of the week was spent in excursions to various points. On Thursday afternoon the members of the Association, under the charge of Mr. Robert Black, went over the entire elevated system in a special train. This trip took about four hours. On Friday, the members went on an excursion about the various waters around New York, and on Saturday they went by special train over the Lehigh Valley to Glen Onoko and Mauch Chunk.

EXHIBITS.

We failed to mention last week the excellent exhibit of the National Switch & Signal Company. They showed the automatic semaphore blocksignal, two torpedo machines and the Evans pipe carrier, all of which have been illustrated in the *Railroad Gazette*.

Verona Tool Works, Pittsburgh, Pa.: Tools and the Verona Nut Lock.

Kansas City Bolt and Nut Co., Kansas City, Mo.: A line of nuts and bolts.

American Washer and Manufacturing Co., Newark, N. J.: The American Lock Washers.

American Nut Lock Co., St. Louis, Mo.: Samples of nut lock.

McDonald Nut Lock Co., New York, N. Y.: Application of their new nut lock.

Ruffner and Son, Philadelphia, Pa.: The Ruffner nut lock.

Adjustment of Defective Counterbalances—Chesapeake & Ohio Railway.

The following method of adjusting defective counterbalances in locomotive driving wheels is taken from a print, duplicates of which are provided to each shop of

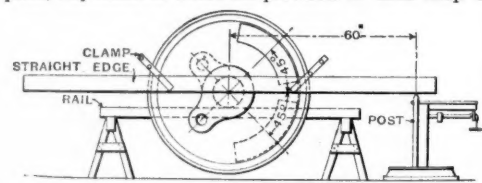


Figure 1.

the Chesapeake & Ohio by the Motive Power Department. The instructions were arranged by Mr. W. T. Hoopes, Chief Draftsman of the road.

Mount the wheels as shown in Fig. 1, using two rails or bars of iron which are smooth on the top side. Set the bars level both ways. Clamp a straight edge to one wheel in such a way that its lower edge is level and on a line with the center of the axle. Lines through the centres of gravity of the counter-weights and the center of the axle should be at angles of 45° with the straight edge. The wheels are kept from turning by supporting the straight edge on a light post bearing on a pair of scales. The distance from the center of axle to the point of support is taken as 60 inches. Multiply the weight obtained on the scale by .7071, the sine of 45°, and reduce the product to an equivalent weight placed at a distance from the center of the axle equal to the distance from the center of axle to the center of gravity of the counterbalances; by increasing or diminishing the weight of the counterbalance, the weight thus



Figure 2.

found, multiplied by the distance of the center of gravity of the counterbalance from the center of the axle should

be made equal to the weight revolving at the crank pin multiplied by the length of crank arm. The weight revolving at the crank pin is taken as $\frac{3}{4}$ the weight of the reciprocating parts divided by the number of coupled wheels on one side, plus the weight of crank pin. The reciprocating parts are taken as the piston, crosshead, $\frac{1}{2}$ of main rod and the entire weight of side rods.

The method of finding the center of gravity of the counterbalance is shown in Fig. 2. A model of the counterbalance, on a reduced scale, is constructed. It is suspended alternately from a point near each of two adjacent corners and a perpendicular line drawn through the points of suspension. The points of intersection of the two lines is on a line through the center of gravity of the counterbalance and the distance from the corresponding point on the counterbalance to the center of the axle is the radius used in the above method of calculation.

The Canda Refrigerator Car.

The long haul from California to New York or Boston with fruit is considered a good test for a refrigerator car. The car illustrated herewith was specially built for the California fruit business, and it has been for two seasons carrying fruit across the continent and delivering it in eastern cities in excellent condition.

Though intended primarily for fruit it is adapted to the transportation of meats, dairy products, vegetables and in fact for all perishable goods, which require refrigeration.

The framing is not unlike that of other modern first-class cars. In consequence of the side doors (61 and 61°)

the Winslow-roof and underneath the eaves fascia-board. The removal of the inside sheathing reveals a light wooden insulating frame stiffened with crossbars, the whole being built of $\frac{3}{4}$ x2 inch pine strips. These frames are cheaply constructed, and fulfill the three-fold office of forming a dead air space, of carrying the tar paper, which is tacked on both sides, and of wedging and holding the felt. This latter office is accomplished by cutting the felt an inch larger on all sides, then the half panel which it fills, and by making the frame $\frac{3}{4}$ of an inch smaller on all sides, the felt being tacked to and folded about the frame and wedged in between it and the posts and braces as shown in figures 8 and 15. The felt being turned, or lapped over the edges of the insulating frames, it is thereby securely held in place, and while entirely independent of the framing of the car, acts as a cushion against shocks, which would tear, displace and injure the insulating materials. The system has to commend it, in addition to its efficiency and economy, the possibility of fixing definitely the cost of erection, which has always been an uncertain quantity in estimating the cost of refrigerator cars.

Next to the felt, on the inner side, is another thin partition of $\frac{3}{4}$ stuff, and inside of it another frame, both sides of which are covered with tar paper. This frame is protected on the inside by a $\frac{3}{4}$ inch lining fluted the same as the outside sheathing. The lining is fluted to make it lighter and to increase the dead air space between it and the tar paper. To effect the contents of the car, heat must pass through four thicknesses of wood, 1 free and 6 dead air spaces, and 1 inch of felt. No cork, charcoal or other filling is used, the insulation being effected

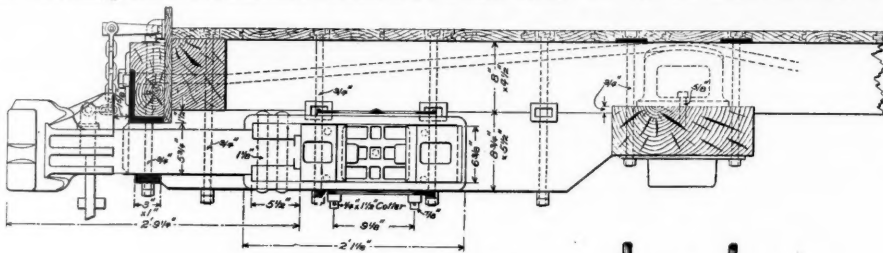


Fig. 16.—Side Elevation.

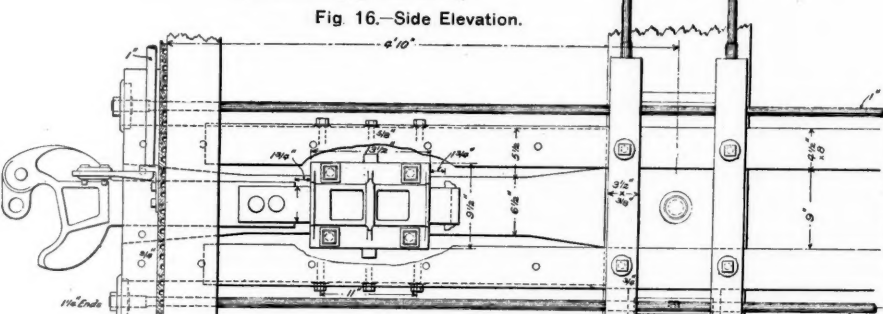


Fig. 17.—Plan.

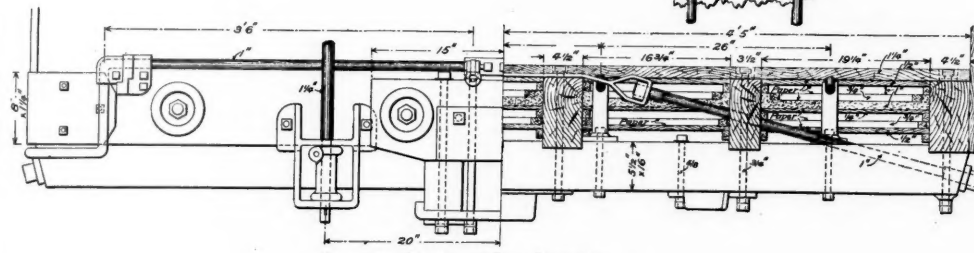


Fig. 18.—Sectional End Elevation.

THE CANDA DRAW-BAR ATTACHMENT.

being set in, a sub-sill (64s) is placed beneath the closed door. This sub-sill rests on the cross-frame tie-timbers to which they are bolted. Four truss-rods stiffen the underframe, pass over the body-bolsters and through the end-sills and buffer beam. The dimensions of framing and the general construction are shown in the engraving. The insulation is a novel feature of the car, not in the materials employed so much as in their application. The materials are hair felt, tar paper and wooden frames and partitions which make numerous dead air spaces. A dissection of a car side will best show the insulation. The first thing to remove will be the outside sheathing of fluted weather-boards (52s) shown in figures 11 and 12. The object of fluting the sheathing is two-fold, viz.; to secure a free circulation of air beneath or behind the outside sheathing so that the interior shall not become warmer than the outside atmosphere, and secondly to make the car lighter. The car is virtually put in the shade, with a free circulation of out-door air around it. The importance of this construction will be appreciated when it is considered that in some localities (notably in the valleys of California), there is a difference of from 30 to 60 degrees between sun and shade.

Under the weather-boards and $\frac{3}{4}$ of an inch from them is an inside sheathing $\frac{3}{4}$ of an inch thick, with which the entire car is covered. This gives a free air space of $\frac{3}{4}$ inch, except where the outside sheathing is nailed to the sill-plate and belt-rails and braces. Where the sheathing crosses these pieces the free air space is contracted to the area of the flutings. The flutings at the plate communicate with the open air through the free air space of

entirely by wood, felt, tar paper and air spaces.

Special attention has been given to the circulation of air within the car and it is best shown in fig. 7. The crates in the ends of the car are provided with air chambers, which completely surround them. The air can pass over, under, through and around the ice as well as through the slats forming the lower portion of the crates. These slats are stepped or lapped one over the next lower one, to catch all drippings from the ice and any condensation of moisture carried toward the center of the crate. The drippings are caught in a drip pan and discharged in the usual way. This construction insures dry circulating air, and prevents water and moisture from coming in contact with the lining of the car, which would greatly impair its insulating properties. The direction of these currents is clearly shown in fig. 7, the air passing in, at the top, and down through or around the crates and then out at the bottom, and along under and up through the slatted floor.

The position of the doors and their design differ materially from those in general use. The door itself is hung upon a frame, which frame slides upon a top and bottom rail, not unlike the door of a common box car. The door may be moved bodily away from the frame and against the car by four toggle joints, actuated by a lever rod and eccentrics, shown in figs. 13, 14 and 15. When closed the door is thus forced under great pressure into a chambered recess against rubber packing, making a perfectly tight joint. The toggles and eccentrics can be adjusted so that any laxness in the packing may be taken up, thus always securing a tight fit.

The door is said to cost no more than the usual double hinged doors in general use, and should make a more nearly air-tight door. An air tight door renders that part of the car near the door available for loading, and which ordinarily is not available for perishable goods, with the usual form of door.

of the attachment is that this housing is made up of plates, top, sides, and bottom which are connected together in such a manner as to insure great strength. The bottom plate is removed by taking off the nuts from the four vertical bolts, in this way access for repairs is had to the draw bar with its strap followers and spring,

Masonry Lining at Mullan Tunnel.*

The Mullan Tunnel is located on the main line of the Northern Pacific Railroad 20 miles west of Helena, at the crossing of the main range of the Rocky Mountains. The summit on line of tunnel reaches an altitude of 5,855 ft.

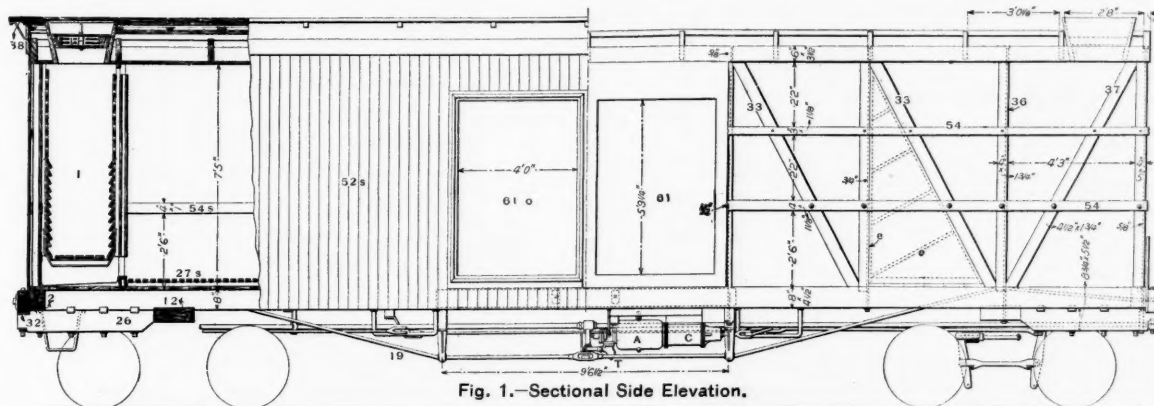


Fig. 1.—Sectional Side Elevation.

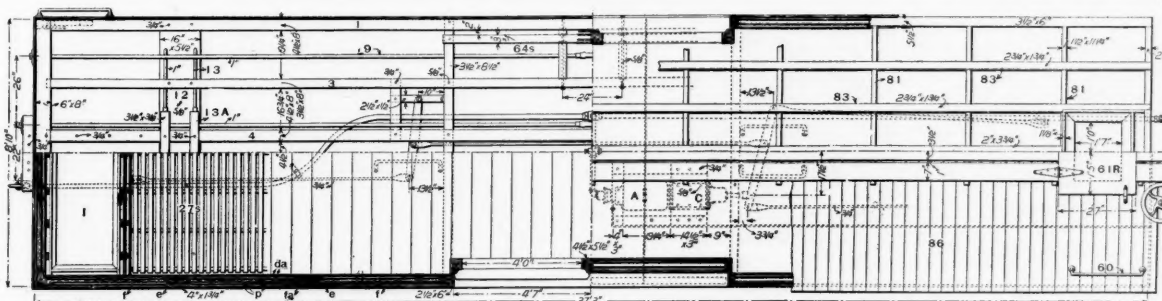


Fig. 2.—Sectional Plan.

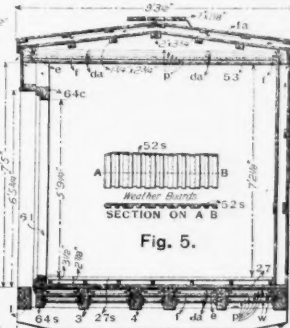
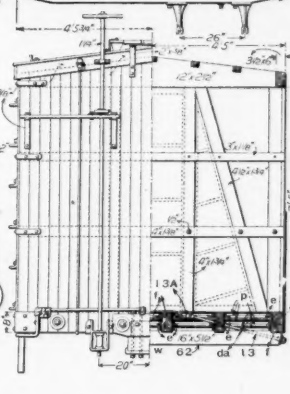


Fig. 5.



Figs. 3 and 4.—Transverse Section and End Elevation.

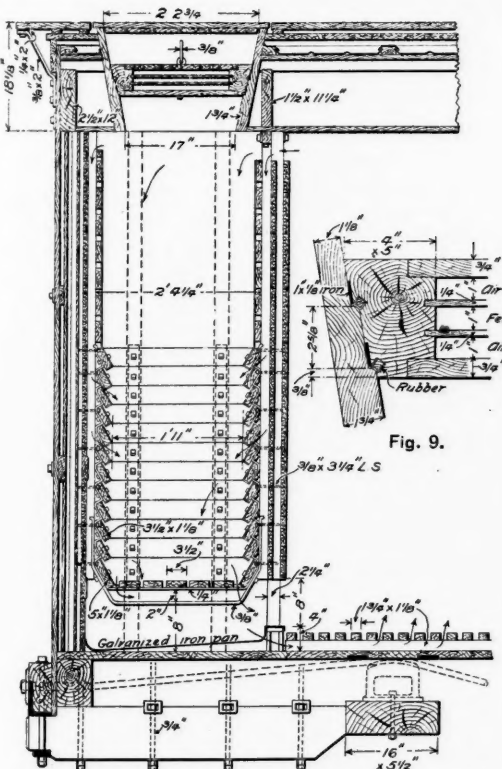


Fig. 7.—Longitudinal Section of Car End and Ice Box.

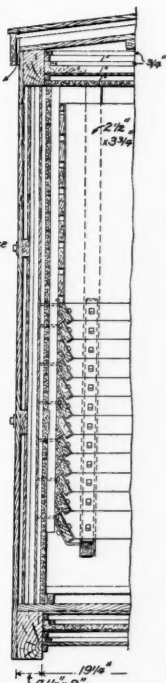


Fig. 10.

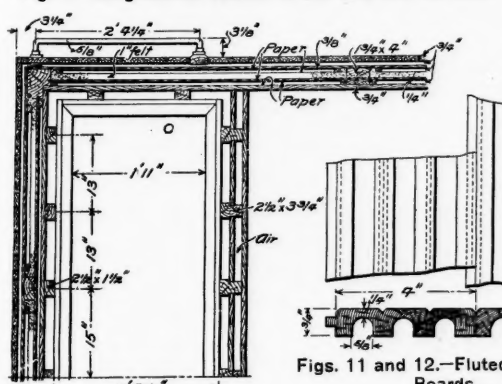


Fig. 8.—Plan of Ice Box.

Figs. 11 and 12.—Fluted Weather Boards.

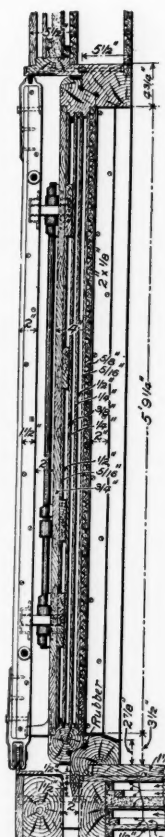


Fig. 13.—Section.

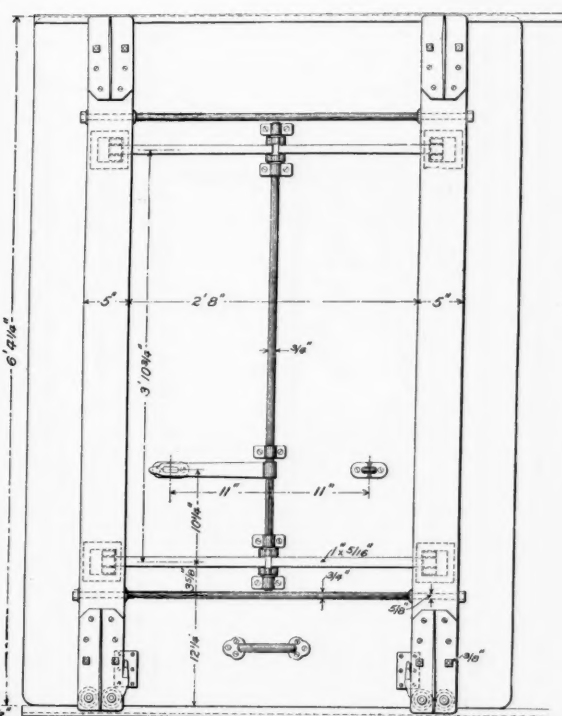


Fig. 14.—Side Elevation.

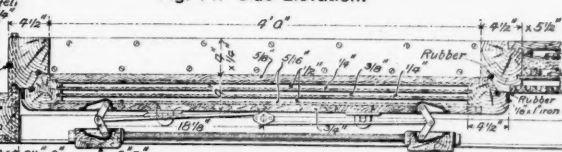


Fig. 15.—Plan. Details of Car Door.

THE CANDA REFRIGERATOR CAR.

Figs. 16, 17 and 18 illustrate the Canda draw-bar attachment as applied to this car. The attachment consists of the usual strap or yoke pocket with follower-plates, which engage with a housing that is securely bolted and keyed to the draft-timbers. The novel feature

and permits their removal from the car without disturbing any other part of the housing, thus saving much time and labor in making repairs.

These cars are in use on the Southern Pacific, and have shown great economy in the use of ice.

above sea level. The tunnel is 3,850 ft. long on a tangent; throughout, the grade, going west, ascends 105.6 feet to the mile, or 2 per cent. The summit of grade is 400 ft. beyond

*By H. C. Relf, member of the Montana Society of Civil Engineers. Reprinted from the *Journal of the Association*.

the west portal and its elevation is 5,548 ft above sea level.

Ever since its completion in the fall of 1883 this tunnel has been a menace to the successful operation of the road, owing to the treacherous character of the material through which it was driven. Traffic has several times been stopped by "cave-ins" and "burn-outs," at one time so serious as to demand the temporary restoration of the "overhead line," which was used for a time before the final completion of the tunnel. This fact, together with the perishable nature of the timber lining, induced the management to start the work of permanent lining in time to avoid any necessity for undue haste in its prosecution, and also to distribute the expense over a greater length of time. Although the matter was under consideration in 1891, it was not until July, 1892, that work on the

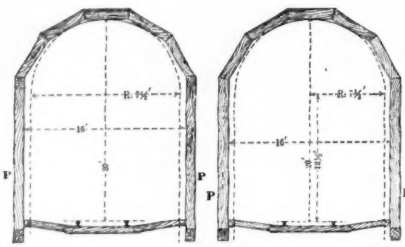


Fig. 1.—With Wall-plate. Fig. 2.—Without Wall-plate. Present Timber Section.

plant commenced, and it was two months later when active operations in the tunnel were begun.

The material encountered in the tunnel is mostly of a syenite formation, interspersed with granite boulders and streaks of clay, through which there is a considerable seepage of water. This necessitated the timbering of a large portion of the tunnel at the time of construction, and more timber was added from time to time by the operating department, until, when this work was started, nearly 3,000 ft. had been timbered. Where falls had occurred, or where there were indications of excessive pressure, close timbering was used, and in some cases the tunnel section had been decreased by placing duplicate sets of timber inside the original set; thus materially increasing the cost of removal for permanent work.

The original timbering, figs. 1, 2 and 5, consisted of sets spaced 4 ft. centers with 12 in. x 12 in. posts *P*, supporting wall plates, figs. 1 and 5, and a five-segment arch of 12 in. x 12 in. timbers joined by ½-in. dowels. The arch was covered with 4-in. lagging, fig. 5. The space between the lagging and the roof was filled with cordwood supported by 4 in. x 12 in. headers, *H*, Fig. 5.

Where the overhead pressure was excessive and where

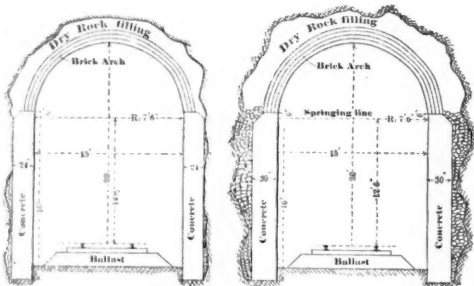


Fig. 3.—Minimum Section. Fig. 4.—Average Section. Permanent Work.

it was necessary to repair breaks caused by falls the wall plates were dispensed with and the crow-foot segment came directly in contact with the post, fig. 2. This character of timbering is more difficult to remove than that shown in fig. 1. Except where reduced by timbering placed inside the original sets, the clear width was made 16 ft and the clear height 20 ft. above top of rail. The dotted lines indicate the dimensions of the permanent section.

Figs. 3 and 4 show the permanent section adopted, the clear width being reduced to 15 ft., while the height remains 20 ft. The side walls are composed of concrete up to a point six inches above the springing line of a semi-circular arch built of brick. This required the removal of all of the original timbering.

The plant for this work is located near the west end of the tunnel. It comprises the necessary tracks, tool-houses, blacksmith shop, boarding-house, water-tank and a cement shed, capable of storing 5,000 barrels. In the east end of the cement shed is a sand bin and engine room, the latter containing a 15-h. p. engine, which runs a dry cement-mixer. This mixer consists of a spiral on an 8-ft. shaft running in a trough. The action of the spiral carries the dry cement and sand from a hopper at one end (mixing it meanwhile) to chute at the other. The latter deposits the product on top of a staging car, to be mixed with water as required for mortar.

The mortar consists of 1 part English Portland cement to 3 parts sand. Alternate layers of cement and of sand, in the proper quantities, are placed upon the floor alongside of the hopper of the cement mixer, into which they are shoveled after being thoroughly mixed by shovels. The rock for the concrete is obtained from a slide of broken quartzite 20 miles west of the tunnel, and requires very little extra breaking to make the size suitable for the work. The stone is carried on an ordinary flat car, which, with one of the cement cars, completes the outfit necessary for work on the side walls,

The drawings for the remaining figures were prepared for the Stampede Tunnel work, which has been under way since 1889, and due credit must be given Mr. Andrew Gibson, the engineer in charge, for their perfection. The Mullan Tunnel work, being identically the same, with

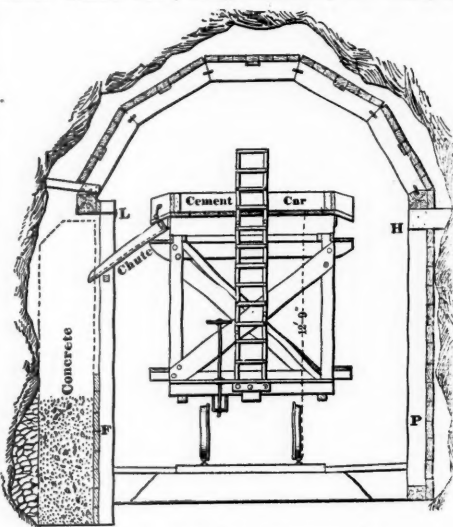


Fig. 5.—Section, with Concrete Car.

the exception of a slight difference of size in cross-section the same drawings suffice for its illustration.

Figs. 5, 6 and 7 show the manner of removing the timber and building the concrete side walls. A 7-ft. section *AB* of the wall, figs. 6 and 7, is first prepared by removing one post, with the lagging and cord-wood filling, if any, behind it, the arch being supported by struts *SS*, fig. 6, from the remaining posts to the wall-plate, or, where there is no wall-plate, to the crow-foot segment on either side. After removing any loose material, and excavating from 2½ to 3 feet below top of rail, two false posts, *FF*, figs. 5, 6 and 7, of 8x10 timbers are set at the proper distance from the center line, and the top of each

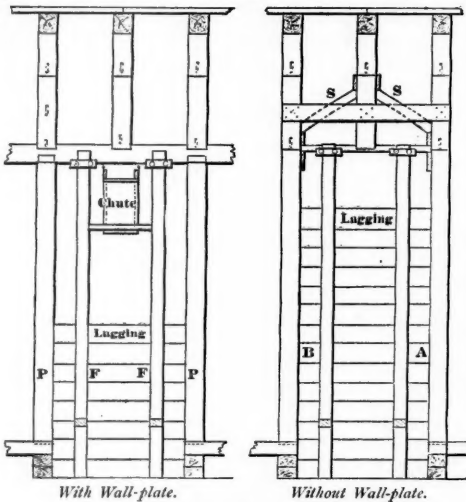


Fig. 6.—Longitudinal Section.

of these is held in place by means of "L" bolts *L*, fig. 5 fastened to the wall-plate, or by a 4 in. x 12 in. header, which is introduced where there is no wall-plate. Two-inch planks are then placed behind these posts, and held in position by means of wedges between the plank and the old posts remaining on each side. The full height is not planked up at once, but only as required. A number of these 7-ft. sections are prepared in this way—A 5-ft. sec-

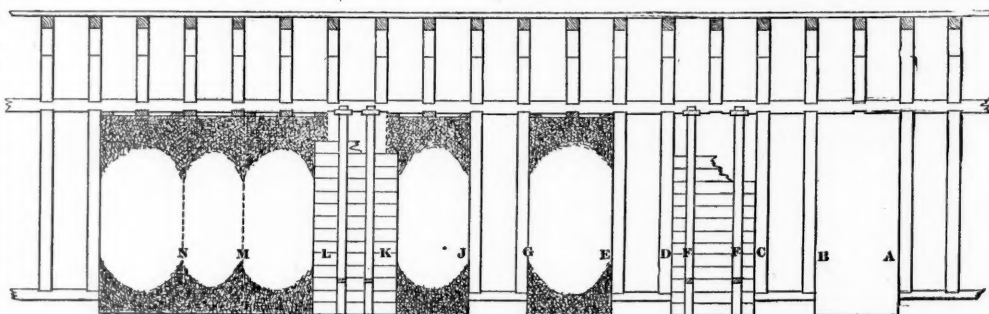


FIG. 7.—METHOD OF WALLING UNDER WALL-PLATE.

tion of timber wall being left between each two, and they are then ready for concrete.

In fig. 7, *AB* represents 1st series, 7-ft. section No. 1, posts removed. *CD* represents 1st series 7-ft. section, No. 2, ready for concrete. *EG* represents 1st series, 7-ft. section No. 3, completed. *GJ* represents 2d series, 5-ft. section No. 1, before removing timber. *JK* represents 1st series, 7-ft. section No. 3 completed. *KL* represents 2d series, 5-ft. section No. 2, ready for concrete.

MN represents 2d series, 5-ft. section No. 3, completing wall. Fig. 5 shows a section of the tunnel with this work under way. Sufficient mortar to make an 8 in. layer of concrete is first run into the section by means of

the chute from top of car. The intention is to use five parts rock to one part cement and three of sand. The mortar car is then moved to another section, and rock from the flat car in attendance is shoveled into the first section until it takes up all the mortar. This operation is repeated at several sections before returning to the first one, which by this time is ready for a second layer, and in this manner the wall is carried up to the proper height.

Should the original excavation allow for more than 30 inches of wall, a back mould is used and the space behind is filled with dry rock carried up simultaneously with the cement, figs. 3, 4 and 5.

After 24 hours the wall is hard enough to stand the removal of the lagging for use at other sections, and in from 10 to 14 days is sufficiently strong to hold the arch, which is then transferred to it by blocking up under the wall-plate or crow-foot segment. The intermediate 5-ft. sections are then ready for similar treatment.

By December, 1892, 1,000 lineal feet of side wall were completed, and the work was then closed down for the winter. It was resumed in May, 1893, and continued until August 12 of the same year, 2,140 ft. of side wall being built during this time, making a total of 1,670 lineal feet

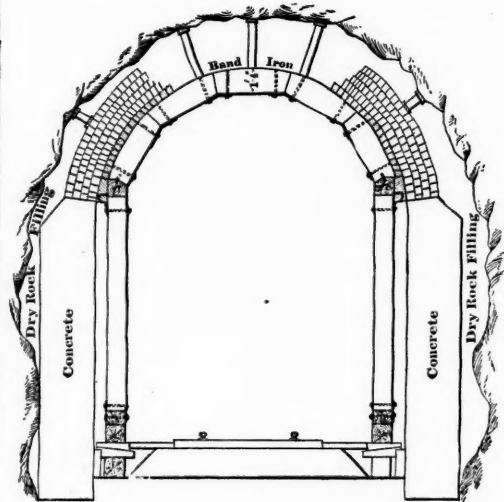


Fig. 8.—Center, with Buckwork nearing completion.

of tunnel up to that date. The average progress per working day was 30 lineal feet of side wall, containing 46 cubic yards of concrete, making an average of 3 cubic yards of concrete per lineal foot of tunnel. The average cost per cubic yard was less than \$8, including all labor required in removal of timber, work train service, lights and tools, engineering and superintendence, and interest on plant.

On Sept. 15, 1893, the work of arching commenced. It is still in progress and 950 ft. have been completed.

The centering used is shown in Fig. 8. There are four ribs in each set, spaced 3 ft. center to center. Upon these ribs 4 in. x 4 in. lagging is laid in 3 ft. lengths. Each rib is strengthened by the use of iron angle plates on the inner sides of the joints and a continuous length of 4 in. x ¾ in. band iron on the outside. Three-inch jack-screws are used to raise or lower the center, and timber dollies for moving it longitudinally. A length of from 3 to 9 ft. of arch is put in at one time, the length depending upon the nature of the ground. The old timbering is generally removed by putting a small charge of giant powder in one of the segments after partially cutting through it. The resulting debris of timber, cord-wood and loose rock is caught by a strongly constructed car placed directly underneath. The top of this car is 12 ft. 6 in. above top of rail. The space between the sides of this car and the wall of the tunnel is covered with heavy planking, so that nothing

can drop below. After this debris is removed by loading it on to another car in attendance, the center is moved ahead and raised to the proper height for the brick work, and timber props are placed on the ribs where necessary to keep loose material from coming down.

The section is now ready for the bricklayers, who use two high staging cars similar in construction to the cement car shown in Fig. 5. One car is supplied with dry cement mortar in the same manner as for concrete and in the same proportion, and the other with brick. The bricks for the work are made at the yards of Jacob Switzer and the Mullan Pass Coal Co., near the tunnel, and are of most excellent quality. The size is 2½ in. x

4½ in. x 9 in. These bricks cost more per thousand than bricks of the usual size, but fewer of them are required for a cubic yard. They therefore cost less per cubic yard for laying, so that they are in the end more economical for the work.

Four rings have so far been used, laid in row locks, and the space between extrados of arch and roof is filled with dry rock. Two gangs, of three bricklayers and six helpers each, are employed, and the present progress is 12 ft. per day, or rather per night, for all work in the tunnel is now done between the hours of 7 a. m. and 6 p. m., there being fewer trains during these hours than through the day. The brickwork is carried up uniformly on each side to the crown as shown in Fig. 8, the roof props being transferred from the ribs to the completed brickwork, as it is advanced, and dry rock filled above the arch. The four rings of large brick make an arch 20 in. thick, giving 1.62 cubic yards of brickwork per lineal foot of tunnel. This costs at present about \$17 per cubic yard, or \$27.50 per lineal foot of tunnel.

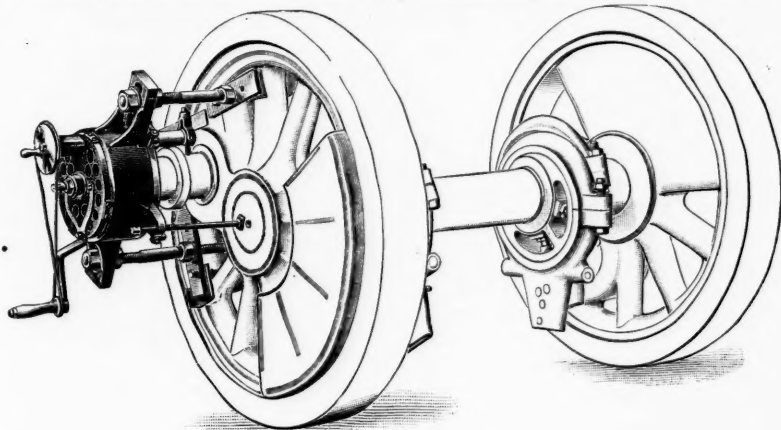
The total cost of the work to date will average about \$50 per lineal foot of tunnel, and this will probably be decreased this season.

No plan for the portal has, as yet, been decided upon, as this is the last work to be done, and it will require about eighteen months to complete the side walls and arch.

All the work is done by the Company's forces, directly under the assistant engineer in charge, Mr. F. J. Taylor, to whose careful and efficient supervision its success is due.

New Portable Crank Pin Turning Machine.

The tool illustrated has been lately put on the market by the Henry C. Ayer & Gleason Co., Philadelphia. It is simple in design and effective in operation and will turn long or short pins, either with or without collar. No offset tools are required, consequently there is no springing of the tool. It can be set with pointer with the face of the wheel or with the bore in the hub of the wheel where there is no collar; this makes it run perfectly true with the original turning of the pin. For turning pins with two bearings the extension bar is used for reaching the inner bearing. A large shell is used to carry the cutter and act as a frame and guide for the tool. The two large



Portable Crank Pin Turning Machine.

lugs on the shell are used to clamp in solidly to the wheel; the two smaller lugs carry set screws that merely true it up and act as feet for it to stand on. A large center point screws through the center of the shell to bring the machine true by entering the drilled center on the pin and there are four jaws on the back of the inside shell that center the collar or flange of the pin.

Inside the shell there is a second shell that revolves, carrying a tool post with it; this tool post is fed out and in by a screw, operated either by hand or the small belt shown. With this device, not only the bearing, but the faces of the collars, can be trued up. When it is desired to turn the inside bearing of a main pin, an extension to the tool post is screwed into place, as shown in the engraving. This machine will true up all pins from 4 in. to 7½ in. in diameter:

Street Car Fenders.

Some time ago a car fender commission was formed in Baltimore, Md., consisting of the Mayor, City Register and City Commissioner, for the purpose of considering the subject of life guards for trolley cars. Mr. Mendes Cohen, Past President Am. Soc. C. E., was employed to investigate and make a report on all fenders which came to his notice. In all, 70 different types were offered, but out of this number, which included nearly all, if not all, of the best known fenders, none met with his unqualified approval.

In his report to the Commission, which has just been made public, Mr. Cohen gives a history of the "cow catcher" and then goes on to show the absolute necessity of some device for the protection of human life against accidents resulting from contact with rapidly moving trolley cars. If the car is traveling at a maximum rate of about six miles an hour, and the human figure is struck in an erect position, it is certainly knocked down. A person thus struck will, in most cases, be sufficiently

stunned to prevent his getting out of the way of the running gear, the result of which is that he is crushed by the wheels.

If the speed be high, the force with which the victim strikes the pavement is likely to be sufficient to fracture his skull, and the running-gear of the car finishes up the work in a few seconds, unless the victim has fallen clear of the track.

It is evident, therefore, that if there is to be an effort made to reduce the amount of injury done in such case it must tend to save the person from being thrown to the pavement. To effect this a guard or fender is requisite in front of the car, which shall, if possible, catch and sustain the victim until the car can be stopped.

While placing a proper fender in front of the car will undoubtedly save many lives, it still in one way increases the danger. It practically lengthens the car to the extent of its projection. An imprudent person in crossing in front of an approaching car may miscalculate its speed and distance and thus be struck by the fender; whereas, in the absence of a fender the car would at that instant have been three and one-half or four feet distant, giving him possibly time enough to clear it altogether.

Then again, in the case of a light skeleton frame which could be used to save weight, it might not be readily seen. Its presence would therefore tend to increase the likelihood of accidents from miscalculated distance.

These objections, however, are not deemed sufficient to warrant dispensing with the only chance of saving the victim, if struck by the car, from being thrown down and having his skull fractured. They are rather arguments in favor of so limiting the speed as to better enable the timid or nervous person to effect the crossing in safety.

Mr. Cohen says that it is probably requisite that fenders of this class shall be capable of being folded back against the dashboard of the car, so as to be out of the way when the car is housed or its direction reversed. Many of the devices are so arranged as to be readily transferred from one end of the car to the other in the last-named contingency, but the method is undesirable and to be avoided if possible.

The case of a person being struck in a prostrate position is then taken up; but in Mr. Cohen's opinion fenders cannot be relied upon to pick up a body under these circumstances with any degree of certainty. Some fen-

ders are designed to be thrown into close contact with the rails, through the action of powerful springs, in case a body falls or is thrown down in front of the car. As the prostrate figure is more likely to be pushed or rolled ahead of the fender than forced to mount it, the chances are that in jarring over the pavement a hand or arm will be caught under the front edge and this jarring, combined with the forward motion of the car, cause the fender to finally ride over the chest of and crush the victim.

The straight rigid gridiron fender, riding about 10 or 12 inches above the rail, tends to break the limbs of a person struck or else knocks him down where he will readily pass beneath the car.

The fender or guard arranged to fall immediately in front of the wheels seems to be favored. Here the closest contact with the rail and pavement may be secured, as it is unaffected by the varying height or undulating motion of the car.

In summing up these different forms, Mr. Cohen is of the opinion that the public is entitled to the protection of a combination of fender and guard, the one external and in front of the car to save the victim from being thrown to the ground, and the other beneath the car and immediately at the wheel, so as to save him when the first fails, as it will very frequently. The external or front fender must be so arranged that if it fails to catch or pick up the victim, it shall yield and pass over him without crushing, leaving the work to the wheel guard. This brings us to discussion of the merits of the several fenders, which most nearly meet the requirements indicated.

The various fenders are grouped into classes, based on form or mode of operation. Class 1 is termed "combination fenders," meaning those which include in one design a projecting front fender, together with a wheel guard, being thus complete in themselves. The following are named under this head as patentees of fenders likely to prove effective in service: William C. O'Brien, J. W. Darley, Jr., William R. Will and W. R. Fowler, all of Baltimore, and the Crawford Mfg. Co., Pittsburgh, Pa.

Mr. Cohen believes that any one of the first four can be made to do good and effective service. The fifth is said to be in use upon numerous roads; but slight fault is found in both the pickup fender and the wheel guard, which it is thought can be easily remedied by a little modification.

Class 2 is "front scoop or pickup fenders," designed to save persons caught, either standing or fallen in the way of an approaching car, but which make no provision for the contingency of failure to pick up the victims. These are divided into two groups. In the first are included such fenders as failing to pick up the victim will not by their form cause injury to the victim in passing over him. It is only from this group that any are selected, and only two are mentioned as worth consideration: Samuel C. Kindig and William J. Ogden, both Baltimore inventors. Neither of these, however, came fully up to the requirements, but both inventions contain good and valuable features. Of course, as already explained, these fenders will each require an effective wheel-guard to operate in connection with it.

Fenders of Class 3 assume to trip the person struck and cause his fall upon the platform, but, like the fenders of Class 2, make no provision for those who are not successfully picked up or saved from falling. Of this class there are but three devices which merit attention, viz.: Louis Pfingst, Boston, the fender used by the Buffalo Street Railway Co., and Ferdinand Groshaus, Baltimore.

The Pfingst fender consists of a platform, which is affixed to each end of a car and slides under it entirely out of the way, when not in use. When in use it is projected by a suitable lever and remains fixed in this position at a level of 10 or 12 inches above the rails. If it strikes a person he is probably tripped and thrown upon the table. If he be not caught but falls upon the ground, the fender will pass over him. In connection with this we might add that this device is in use on the West End street road of Boston, and the Brooklyn Heights and Kings, Queens & Suburban roads of Brooklyn. This fender was condemned in Boston, and has, within the last few weeks, struck and killed several children in Brooklyn.

The Buffalo car fender differs from the last only in the fact that it does not slide under the car. It is so arranged as to be readily detachable and, when the direction of the car is reversed, the fender is lifted off by the conductor and motorman and transferred to the other end of the car.

Dr. Groshaus' fender is not thoroughly worked out in its mechanical details and would not be entitled to notice, except for the elastic edge, which is good and may be fairly relied on to trip a person without seriously bruising or injuring him.

Class 4, or wheel-guard fenders, with or without scoops, are intended to protect from being crushed by the wheels any victim whom the front fender has failed to save. In this class several are found worthy of attention. They are the fenders of which The Detrick & Harvey Machine Co., Baltimore; S. D. Wright, New York (in use in Philadelphia); George Blakistone, Baltimore (on entire equipment of the Central Railway Company of Baltimore); H. S. Robinson, Fallston, Md., and F. Groshaus, Baltimore, are the patentees.

The Detrick & Harvey fender has some good points. It combines with its action as a wheel guard a powerful skid-brake. It would require, however, some modification in its application to actual use.

The design of Mr. Robinson is capable of being made a very effective wheel-guard. Its angular or "pilot" form commends it as promising increased efficiency wherever there is room for its application.

Dr. Groshaus' fender differs essentially in form from the others here considered. It has value, and it may often work well and save life, but it cannot be depended upon to do so under circumstances as varied as can be met successfully by the other forms. This fender has in its favor the record of having saved a life without an injury to the victim, while it was in temporary use on one of the lines of the Baltimore Passenger Railway Company.

All the fenders in this class require combination with a front guard for successful operation.

In concluding his report Mr. Cohen says, in part:

What is needed is a very simple piece of work, the more simple the better.

It is required that the front surface of the car, striking a standing human being, shall be so arranged as to afford a reasonable prospect of saving the person from being dashed to the ground; and, further so arranged, that it shall do the least possible damage by its own impact; and, further if it fails to do the duty expected of it, and the person does fall to the ground, or is already lying there, that it shall be so devised as to pass over him without causing further injury; and that there shall also be on each car a suitably arranged wheel-guard, preferably of angular or "pilot" form, which shall be automatically brought in close contact with the street and rails, in order to prevent the crushing of the victim, whom the front device has failed to save.

Any one of the fenders mentioned under Class 1 can be made to do this work, but any one of the four first named will require the aid of the mechanical foreman and of the railroad company first using it to put the device into practical shape.

Pintsch Gas Plant at Houston.

Mr. Clarence H. Howard, secretary of the Safety Car Heating & Lighting Company, has arranged to have work commenced immediately upon the erection of a plant to manufacture Pintsch gas at Houston, Tex. It was planned to build this factory early in 1893, but the work was postponed on account of the business depression.

Master Car and Locomotive Painters' Convention.

The twenty-fifth annual meeting of this Association was held in Buffalo, N. Y., on the 12th, 13th and 14th of September, the headquarters and place of meeting being at the Genesee House. The convention was called to order on Wednesday morning by President William J. Orr (L. S. & M. S.) who made a short address of welcome.

The attendance was 91, the largest in the history of the Association. Secretary McKeon (N. Y., L. E. & W.) presented his annual report, which gave the membership as 163, being an increase of 13 since the last report. The election of officers for the ensuing year resulted in the choice of the following: President, W. T. Leopold (C. Ga.) Savannah, Ga.; First Vice-President, C. E. Copp (B. & M.) Lawrence, Mass.; Second Vice-President, George R. Cassie (L. S. & M. S.) Adrian, Mich.; Secretary and Treasurer, Robert McKeon, Kent, Ohio. Mr. McKeon was re-elected for the twentieth year, and the members gave him a diamond pin. President W. T. Leopold, in assuming the chair, said the work of the Association is felt by the roads in the saving that is brought about from the ideas brought out at the annual meetings and from the free interchange of practical views given in the discussions.

The members with their ladies (who were present in large numbers) visited Niagara Falls on Thursday afternoon as the guests of the Erie Road, going by special train.

The subjects on the programme were thoroughly discussed.

First. Which is the best method of keeping accounts in the paint shop, labor and material; three papers were read. L. A. Little (P. R. R.) Altoona, Pa., had found the card system the most simple and accurate. It consisted of four cards; the employees' service or time card; the employees' shop order material card; the requisition card and the storehouse material card. C. E. Maine (N. Y., O. & W.) used the ruled card for keeping account of both stock and time, and each man using stock puts it down under his name with the time he spends on the job; these cards are furnished each man daily. The foreman examines, and if correct, signs them, then enters all items of stock and time in the regular stock and time book.

Eugene Laing (Nor. Cent.) favored the card system as used by the Pennsylvania, but he thought it was not so good for day work as with the piece-work system. The subject was well discussed and the views of the Committee were almost wholly indorsed.

Second. What methods and materials produce best results in repainting passenger cars that are badly cracked, and is there any method by which cracks in old paint can be obliterated without burning off. J. H. Pitard (Mobile & Ohio) stated in his report that varnish cracks were only the depth of the varnish; paint cracks extended through both paint and varnish; there is no feasible method by which they can be permanently obliterated except burning off. Any attempt to hide them, no matter how flattering the immediate results, sooner or later fails under the scorching rays of the sun. In the treatment of cracks in varnish that has yet some life a passable job can be made by applying two coats of varnish color made of hard drying varnish and colored to match the color of the car; when dry rub down to a surface with ground pumice stone and water. By this means the cracks are filled with material similar to that surrounding them, which produces a uniform surface; follow up with coloring, and varnish in the usual way. Mr. Scott and Mr. Hauser agreed with Mr. Pitard and these views were indorsed by the meeting. It was also demonstrated that even if paint cracks could be thoroughly filled up to a surface, the expense would be fully that of burning off and repainting the body of the car.

Third. Classification of repairs of passenger cars; how to determine when the condition of the paint requires a certain class of repairs. This was reported only by Messrs. Cassie, Guest, and Gohen, and discussed at length, but no definite decision was reached, and it was referred to a committee consisting of F. W. Ball (P. R. R.), John Rottenberg (Chicago, Rock Island & Pacific) and J. H. Stout (Baltimore & Ohio), who reported the following later in the session:

Class A, outside; paint badly cracked and scaled; burn off and repaint, trucks included. Class A, inside; general perishing of varnish and cracking, or at least $\frac{1}{4}$ of car powdering; if hard wood and varnish finish, scrape to the wood, refill and varnish. If the interior finish is paint or enamel the equivalent of the amount of work indicated should govern. Class B, outside; paint slightly cracked, but no indications of scaling; clean down thoroughly, sandpaper closely or rub to a surface with lump pumice stone; recolor, stripe, letter and ornament, finish in the usual way. Class B, inside; One-fourth cabinet repairs, sills, capping, window strips to be scraped where needed; fill all repaired and scraped surfaces; touch up with one or more coats then one coat of varnish all over and finish as usual. Class C, outside; varnish perished, paint good, but faded; cut in or touch up and revarnish as usual. Class C, inside; car generally good inside; touch up minor repairs; clean and oil, also varnish from window sills to floor and finish as usual.

Fourth. An essay by F. S. Ball (P. R. R.) Altoona, on painting passenger cars. This was in the form of questions and answers and was one of the best papers

presented. It was largely elementary, but showed a thorough study of the subject.

Fifth. What is the best basis of rates for piece work on passenger car repairs. T. H. Dunlap (B. & O.) gave in detail the entire operation on all classes of cars. He had kept a record of actual work and established rates. F. P. McCullen (P. R. R.) also read a valuable paper. The general opinion and practice of the members who had piece work in their shops, was that deducting a percentage from the cost by day work was a fair way of making piece work rates. The same rules should govern painting of locomotives (subject No. 6).

Seventh. Best way to prevent loss of paint shop tools. H. G. Taylor (P. & W.) said bristle brushes used in lead or minerals should be kept in water; also camel hair brushes used in color. Bear hair brushes should be kept in turpentine, and varnish brushes in the varnish they are used for. Varnish brushes should never be cleaned in turpentine as it causes the bristles to break; clean them in varnish, working them out well. Mr. Taylor would furnish each varnisher with a kit of brushes and have him take care of them himself; though in a large shop, where there are competent men in charge of the stock and tool-room, brushes should be kept there and given out on the check system, all other tools to be kept in the same way.

H. M. Butts (Nor. Pac.) took a different view; he gives each workman a complete outfit suitable for the work he is required to do; the tools are charged to him, making a great incentive to their proper care. Loss of brushes is largely due to the practice of allowing them to be used in common. "What is every one's business, is no one's business" has an application here. Each man should have a brush-keeper, made of tin, 9 inches square and 10 inches deep, with cover and partition through the center. These should be numbered and arranged on shelves in the stock-room. Paint pots, varnish pails, chamois skin, etc., should be kept in the stock room, where the foreman can see them and examine each kit of tools at his pleasure and note their condition.

Eighth. What advantages in using ready prepared primers and surfacers on cars and locomotives. R. J. Kelly (L. I. R. R.) took a decided stand in favor of prepared primers and surfacers. The shop had no means of mixing and grinding and no conveniences to put mills in them, and he believed the prepared primers were more economical and as good as lead prepared in the shop. The color makers give us reliable goods. There is a saving in having surfacers all ready for application, and the time required to do the work is less. J. E. Blockside (D. & H.) did not agree with Mr. Kelly's paper (which was read by the Secretary). He acknowledged that work could be done more rapidly, but as to the wear he had not had satisfactory results. A general discussion, however, brought out the fact that the Convention was very largely in favor of prepared primers and surfacers as it was necessary to turn out painting rapidly, and few shops had the facilities for preparing and grinding.

Ninth. What primers and surfacers which do not contain white lead have proved satisfactory on the outside of passenger cars and locomotives. F. W. Wright (Mich. Cent.) finds metallic paint fully as durable as lead. C. E. Copp had tried several kinds, but his experience was not satisfactory. He still favors lead. Members of the Association must not publicly state their preference for any manufacturer's production, but the majority appeared to favor prepared primers and surfacers, and it was evident from the remarks that three-quarters of the members were using them.

Tenth. What style of woodwork finish of passenger cars is the most desirable from a painter's standpoint. J. G. Keil (Chicago & Alton) was decidedly in favor of sheathing and the single board 2 or 2½ in. wide, with a very shallow groove, say 1-16 in. deep, and having its edges well rounded; the narrow strip will shrink but little, while a 5 in. board with a groove through the center will shrink just double and will leave a place for the varnish to run into. The life of paint on sheathing as compared to a panel car is two years longer; the car is easier painted and there is no trouble in repairing, as with panel cars. T. H. Cornish (Southern Pacific) said that the panel finish was expensive and difficult to repair and required too much time to surface. Sheathing could be surfaced sufficiently with sand paper, and thereby save the time and expense of putting on and rubbing down the filling to a surface. Samuel Brown (late of Old Colony) favored the tongued and grooved siding; we can make a more presentable job with less labor. Discussion on the subject showed that sheathing has come to stay. If the bead or groove is properly made and narrow strips used, all objections can be set aside.

Eleventh. Report of Committee on Tests. John Jorenhaus (P., Ft. W. & C.) presented a lengthy report for the committee, which gave the processes used in making white lead, linseed oil and varnishes, and stated the causes for the many devilities in the use of varnish. This closed the discussions, all of which will be published with the reports of committees by the Secretary.

The President announced the following standing committees for the ensuing year: Committee on Information: John T. McCracken, Jackson & Sharp Co., Wilmington, Del., J. H. Winters, J. A. P. Glass, Wm. O. Quest, J. H. Pitard, J. W. Houser.

Advisory Committee: Chas. E. Copp, Boston & Maine, Lawrence, Mass., M. L. A. Gardiner, A. J. Brunning, Wm. E. Hibbard.

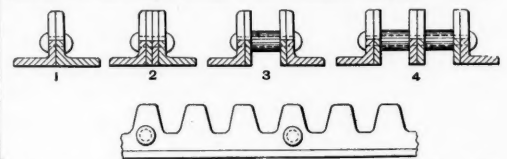
Committee on Tests: A. Hunnicke, T. H. Dunlap, H. G. Taylor, George R. Cassie.

The next convention will be held in Cincinnati, the second Wednesday in September, 1895.

A New Rack Rail for Mountain Railroads.

A new system of rack rail is being introduced by La Société Anonyme d'Ougrée, of Ougrée, Belgium. The new rail is simple, consisting only of two angle bars, with or without flat iron plates being interposed, connected up together by rivets or bolts, and in which the teeth have been cut out.

When only a low resistance is necessary, the rail consists of but two angle-irons as in Fig. 1. When great resistance is required iron plates are interposed between, and bolted up with the angle irons as in Fig. 2. The rail is fixed to either wood or iron sleepers by the horizontal portion of the angle irons. The number of plates inter-

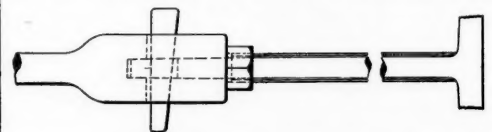


posed between the angle irons may be increased at will, according to the required resistance. Another arrangement is shown in Figs. 3 and 4. In this case the angle irons are not bolted close up together, but spacers are used on the bolts, thus forming a double or triple rack rail.

Among the numerous claims for this new system of rack rail may be mentioned: Considerable economy in manufacture; rapidity of manufacture; safety arising from the fact that the transverse section of each tooth contains several elements, instead of being formed of a single piece; solid attachment to the sleepers; easy variability of the section, and therefore of the price, according to resistance required.

A Valve Stem Shield.

It is frequently the case that a valve stem is worn considerably by the stuffing box, and the usual method of procedure is to turn down the valve stem when the amount of wear becomes sufficient to cause trouble in the stuffing box. After two or three turnings the valve stem must be renewed and this is generally done by cutting off



the stem, near the yoke, and welding on a new one. This necessitates cutting a slot in the new stem for the key in the connection of stem and rod, and in small shops which are deficient in slotting or milling machines it is a costly job to cut the key away and serious delay is often caused.

The illustration shows an arrangement devised by Mr. H. M. Smith, Master Mechanic of the Terminal Railroad Association of St. Louis, by which the stuffing box wear is borne by an inexpensive piece of pipe which, when seriously worn, can be replaced even cheaper than the stem can be returned and the valve stem need never be replaced on account of wear caused by the stuffing box.

A piece of pipe, turned on the outside and a neat fit for the valve stem inside, is slipped over the valve stem before the connection with the rod is made. The pipe is threaded at one end and provided with a nut. The pipe is a trifle shorter than the distance from the end of the valve rod to the yoke and after the key in the connection of stem and rod is driven into place, the nut is unscrewed from the pipe so that the pipe is held firmly between the end of the valve rod and the yoke. The idea is to transfer the wear from a piece that, in many shops, is expensive to replace, to a piece of material which in any shop is comparatively much cheaper and which can be quickly replaced in any shop.

Recent Improvements in Cable Traction.*

By G. W. McNulty, M. Am. Soc. C. E., Chief Engineer Metropolitan Traction Company.

While the title of this paper is very general, it must be understood that the paper will be limited to a description of those improvements which have been embodied in the Broadway cable road of New York City. . . In view of the writer's connection with the Broadway road from start to finish, he could hardly describe as an improvement something not used on that road without having to explain why it was not used—a task that might sometimes be awkward and occasionally invidious.

What, therefore, are considered to be the more important improvements adopted in the construction will be briefly described under the following heads:

1. Power-Houses. 2. Power Plants. 3. Cables. 4. Vault Work. 5. Track Work. 6. Cars. 7. Car Barns.

It must be distinctly stated that originality is not claimed for these improvements. Many of them had already been used on other roads, but not so long that they could not properly be called "recent." Also of those used on the Broadway road, the writer, while he had to decide as to the adoption of all, does not claim to have originated all, or even most of them. He was fortunate

*A paper before the Rochester Convention of the Street Railway Association of the State of New York.

in being able to surround himself with able assistants, and to their suggestions many of these improvements are due. It is, however, very difficult to give exactly due credit in all cases for improvement, often the outcome of prolonged discussion and experiment and to avoid possible injustice to any the above general acknowledgment will alone be made.

1. Improvements in Power-Houses.—As the upper part of the Houston street power-house was to be rented for store and office business, it was important that no vibration from the machinery should be perceptible above the basement. Also, as the driving plant had to be installed and started before the building was completed above the first floor, and was everywhere pierced by columns supporting the upper floors, there was danger that with the imposition of the additional load of eight more stories, the compression of the soil might disturb the machinery foundation and throw the shaft bearings out of line. Fortunately, the remedy for both evils was the same, namely, to isolate the column foundations, which were composed of "I" beam grillages resting on concrete. This was accomplished by surrounding each foundation by a steel cylinder driven to its full depth, six feet, into the sand. The machinery foundations rested entirely on the sand outside of the cylinder, and where necessary the column foundations were bridged over by "I" beams. The cylinder made a sort of slip joint between the sand inside and out, so that they could settle independently of each other. The result was very satisfactory. There has been no trouble from vibration, or disturbance of the alignment of the shaft bearing.

The ventilation of the power-room of the Houston street station was a somewhat difficult problem, which has not indeed been entirely solved. . . Provision for the health and comfort of the men was also made by ample bathrooms and convenient and well-regulated clothes lockers.

At the Houston street station the coal was dumped into vaults under the rear sidewalk wall, which were high enough above the boiler room floor to permit the coal to run out into wheelbarrows, from which it was shoveled into the furnaces, the only handling it received in ordinary circumstances. Hoppers under each furnace discharged the ashes into wheelbarrows whence they were dumped into the foot of a link belt elevator, and raised to a bin from which they were discharged into carts in the rear driveway, all without handling. A reserve of several hundred tons of coal is kept in some lower vaults from which it can be wheeled to the elevator above mentioned, and raised above the driveway and discharged by a chute into barrels on the boiler room floor. An important part of the equipment of a power-house is the system of hoists by which, not only the repairs and renewals of the plant, but also its installation is vastly facilitated. The time saved by such appliances is of special importance, where, as on the Broadway cable road, no stoppage of the machinery can be permitted.

At the Fifty-first street power-house, where there were no columns, it was easy, by means of trolleys running on fixed and traveling beams to command every part of the room, and by the use separately or in combination of a 5 and a 10-ton hoist to lift and transport any weight up to 15 tons.

This arrangement has practically nearly the convenience of a large traveling crane at very much less cost, and has the additional advantage that it can be used in two places at the same time, and cannot be disabled by a single breakdown.

At the Houston street power-house the multitude of columns, combined with the limited headroom, made any complete system of trolley hoists out of the question, but by placing a trolley girder over the line of the engine shaft, and one over each line of the cable driver shafts, and a pair of trolley girders over the jackshaft, it was possible to lift any portion of these shafts or their attachments, and carry it to the side of the room, where it could be conveniently got at, or removed. By a combination of four-ton hoists it was possible to lift 16 tons at the jackshaft and 8 tons at any of the other shafts. Separate trolley beams are provided for each engine to lift cylinder heads and pistons. In the Fifty-first street house a steam capstan and a pair of winch heads, running at different speeds, have been found very convenient in the rapid handling of heavy weights and in pulling and hauling around the floor. Unfortunately there was no good place for anything of the kind at Houston street.

2. Improvements in Power Plants.—Following the course of the power, we find on each boiler an automatic valve, so called, through which the steam passes on its way to the main. In its ordinary operation it is simply a check valve in case of a rupture of any part of a boiler, to prevent all the rest of the battery from blowing through the injured one. There is nothing new about this, but the valve is so managed that by moving a small lever it will also automatically close against the pressure of the steam, and by having the levers of all the valves on a battery of boilers connected together by a single chain which may be led to any convenient place, it is possible in case a steam main bursts or a general smashup occurs in the engine-room to safely and certainly shut off all the boilers in a very few seconds by a single pull of the chain.

Following the power through the engines, which present no novel features, we come to the transmitting gear connecting them to the cable drivers. Here rope drivers were adopted, not only to avoid noise and vibration incident to the use of gearing, but to give a degree of flexibility in the relative motions of the cable drivers that would otherwise have been obtained.

This latter object was obtained by transmitting power to each shaft of the cable drivers by a separate set of cotton ropes whose elasticity permitted instantaneous slight changes in the relative speed of the drivers to accommodate sudden changes in the stress on the cable due to the variations in load, and also allowed a slight and continuous difference in that relative speed if required to compensate for the shrinkage or creep of the cable due to reduced tension as it leaves the drivers. A continuous variation, however slight, in the relative speed of drivers without slip of the cotton ropes does not at first sight seem possible without corresponding variation in the ratio of the diameters, but a little study of the conditions which are obtained while transmitting power by an elastic medium will show that such variations of speed cannot be avoided if the resistance varies. In this case such variations accomplish measurably the purpose of loose differential rings in avoiding undue stress on the cables while passing over the drivers, and the unequal wear of the grooves resulting therefrom. An experience of over a year shows that the grooves wear very uniformly.

Another feature of the plant that has been carefully studied, has been the interchangeability of its different parts. By this is not meant the ability to move and replace, but to make a variety of different combinations, so that the plant can never be totally disabled by a single accident. For instance, in the Houston street plant, there are four engines and four cable drivers, and any engine

can be connected to any pair of drivers, making 16 possible combinations. All important pipes are also duplicated, so that really our only sole dependence may be said to be the smokestack.

The signal system is believed to be a marked improvement over anything that has been done before, and while a large part of it is necessarily connected with the street work, it may on the whole be the described here. Its operation is as follows: When an employee wishes to communicate with the power house, he goes to one of the signal boxes, which are located a few hundred feet apart and just outside the train rail; he lifts a small cast iron cover, opens the box inside and pulls a handle a certain number of times, corresponding to the signal he wishes to send in. In the engine room a large gong strikes the same number and a hand on a large dial points to the corresponding signal. When this has been done, the number of the box from which the signal has been sent in is struck on a small gong and at the same time both numbers are printed on a tape for future reference. Besides the usual signals for starting or stopping the cable, etc., and sending assistance, provision is made for "plugging in" a portable telephone at any signal box. A separate signal system is provided for each of the three cable divisions.

3. Improvements in Cables.—There is nothing novel about the cables, except their size—1½ in. diameter—which is believed to be larger than any previously used on street railroads. Those on the lower sections are about four miles long, and at a speed of six miles an hour, and 40 seconds headway, may sometimes be hauling as many as 60 cars at once. Doubtless, a 1½ in. rope would have been strong enough, as well as cheaper and lighter, but it would have stretched nearly 50 per cent. more under varying loads, giving a more irregular motion to the cars, and increasing the travel of the tension weights and the wear on the cable drivers. Its durability would for this reason have perhaps been decreased and in an even greater ratio, and as frequent change of cables is a serious inconvenience, as well as expense, the larger cable will probably prove cheaper as well as better.

The large cables weigh nearly 40 tons each, a little over that indeed when mounted on the spools for shipment. They are delivered by a floating derrick to a special truck on which they are hauled to the power station by horses. There a square cast iron shaft is put through the square hole in the spool and secured and centered by cast iron wedges drawn together by large bolts. The spool is then mounted in a wrought iron frame, the pillow block having spherical bearings so that no cramping of the shaft can occur. The old rope is then cut, and the new one having been led over permanent sheaves to the tension run is spliced on the other end of the old rope, brought up over the other permanent sheaves to a reel on which it is wound by a pair of engines geared to it, and having sufficient power to draw the old rope out and the new one in without assistance from the main engines. The shears, used to cut the old rope into convenient lengths for handling, can also be used for shearing and punching metal plates, often very convenient in repairing.

With these arrangements an old rope can be drawn out and a new one substituted and started up and the cars shifted over to it in a very short time and without the gripman being aware that any change has been made. The old rope can be cut up at leisure, being wound off by reversing the engines that wound it on.

4. Improvements in Vault Work.—Under this head is included all work below the street surface, except that immediately connected with the track. Perhaps the most important improvement here was the side motion gypsy. In this device, the cable as it enters the conduit and just before it is engaged by the grip, goes over a vertical sheave which carries the cable at the proper height to enter the grip, which, after it has passed the sheave, strikes a lever which forces the sheave horizontally into the conduit and lays the cable in the open jaws of the grip. When the grip leaves the lever the sheave is withdrawn by a spring. The arrangement is entirely automatic and has worked very well. It cannot, however, be used except where the cable enters the conduit.

Another gypsy, intended for use in all parts of the line, raised the cable from below the grip by a spiral wheel, which, while revolving, had the requisite lateral motion given by cams on its shaft. The motive power was supplied by cable which entered a V groove in the spiral, and at the last of the revolution compressed a spring which, when released by the passage of the next grip, threw the spiral into part engagement with the cable. The device for a time worked well, but as its operation depended entirely on the friction of the cable in the groove, it was soon found that when the rope became well lubricated and the groove a little worn its action was unreliable, and its use was discontinued. This gypsy being actuated only by the live cable, could not under any circumstances throw it in the dead one, a point of much importance where two cables are run in the same conduit. Another gypsy has since been devised which can also be placed on any part of the line, which will automatically select the right cable, and is much simpler in construction, as well as more reliable in operation. As it has not yet been protected by patent, its operation will not be further described.

The problem of "floating" a 100 ft. or so up a 1 per cent. grade from the middle to the lower section of cables in front of the Houston street power house received much attention. Although it was believed that it could be successfully done, it was feared that where so many vehicles are passing frequent delays must occur from obstructions of various kinds; so to avoid the trouble and expense of keeping men and horses on hand in case of any emergency, a so-called "lazy chain" was installed. This consisted of a heavy endless chain of the link-belt type running in a trough under the slot and just below the grips, which were to be engaged by projecting hooks attached to the chain and held up by springs to permit them to recede when the grips moved faster than the chain, and when the cars slowed down they would catch and propel it. To enable the gripman to stop after the lazy chain had caught, the chain was driven through a friction clutch adjusted to slip if the gripman put on the brake, and, as an additional precaution, and to prevent the friction clutch from being destroyed by a long stoppage of the car, a reducing valve was put on the steam pipe by which the pressure was kept too low to permit the engine to slip the clutch for more than one or two revolutions. As the engine was double, it would start again as soon as the brake was taken off the car, so that as far as the gripman was concerned its manipulation was much the same as if he had hold of the cable or was on a down grade.

Fortunately, further experience showed that with proper care the track could be kept clean, so that the cars would always float over without trouble, especially as in reaching this point they were gripped to a high-speed cable which gave the requisite velocity.

A modification of this device, with the lazy chain working in a horizontal position, was intended to be used to operate a curved cut-off or short circuit at Bowling Green or State street in case of accident or congestion at South Ferry, but that also has so far proved unnecessary.

As it was very difficult to lubricate by hand the bearings of the deflecting wheels in the vaults while in motion, a grease reservoir was clamped to some convenient point on the V frame and connected to the bearings by lead pipes, through which the grease was forced at intervals by screwing down on a piston in the reservoir and directed by cocks to the upper or lower bearings as required.

(To be Continued.)

Electric Railroads in Maryland.

The notion of building long distance electric railroads, which is now so popular in many States, seems to have had for some time a particularly good hold on the imagination of the people of Maryland. The State is moderately well supplied with steam railroads now; that is, it has about 13 miles of railroad per 100 square miles of territory, and there are but two of the Interstate Commerce Commissioners' State groups which have more; that is group 2, which includes New York, most of Pennsylvania, Maryland, Delaware and New Jersey, has 18.42 miles of railroad per 100 square miles of area, and group 3, which includes Indiana, Ohio, and the southern peninsula of Michigan, has 17.75. Group 1, the New England States, has a smaller mileage compared to the area than Maryland, being 11.39. In miles of railroad per 10,000 inhabitants, the State falls slightly below the Interstate Commerce Commissioners' groups 1 and 2.

It is often said, however, and probably somewhat felt, that the railroad system of Maryland is rather one for through traffic than for local business, and this feeling has perhaps stimulated electric railroad speculation to unusual activity. Moreover, on the Eastern Shore where there is a considerable population, the railroads which exist are so disposed that they do not give direct and easy communication between the more important towns.

To show what a hold the prospect of using electric railroads for local traffic has taken upon the public mind in Maryland, it is necessary only to mention the several projects which have been proposed. Nearly two years ago a company was formed and stock subscribed for building an extensive system in Frederick and Washington counties connecting Frederick with the principal towns of the Catoctin Valley and running over into the Middletown Valley, the whole system finding a terminus at Brunswick on the Baltimore & Ohio Railroad. This ambitious scheme fell through after a few thousand dollars had been expended and a futile effort had been made to break ground for the line over Catoctin Mountain.

A similar project has been advocated on the Eastern Shore of Maryland, to unite the several county seats. A company to promote and build this line is in existence though nothing has actually been done toward placing the stock or making capital available for the construction of the lines. In this connection also may be mentioned the Baltimore-Washington Boulevard, which has been talked of for several years, an enabling act having been passed by the Legislature for acquiring the right-of-way and building the road through Baltimore, Howard and Prince George counties. These are three of the most ambitious schemes which have been projected.

Some further idea of the active interest in electric railroads may be gathered from what is being done in extending lines from Baltimore to several parts of the State. August 3, ground was broken on the Baltimore, Middle River & Sparrow Point Railway. This will open a line of local traffic from the city down the north bank of the Patapsco. Late in August a meeting was held in Westminster, Md., to promote the project of building a trolley road from Reisterstown through Westminster to Union Mills. This will be part of a line proposed between Baltimore and the battlefield of Gettysburg. The Traction Company of Baltimore, already has a branch in operation from the old boundaries of the city to Pikesville, a distance of 7 miles. This line was opened in 1893, and is earning 6 per cent. on a capital stock of \$500,000. A company exists, and contracts have been let for grading and laying track, for operating a road between Pikesville and Emory Grove. This line will be virtually an extension of the Traction Company's branch and will run through to Reisterstown, 9 miles from Pikesville, and is expected to be ready for passengers at the opening of the camping season in Emory Grove next year. The company forming in Westminster will take up the work of extending this line from Reisterstown to Union Mills in Carroll County, a distance of 17 miles. This would leave only 17 miles to be traversed between Gettysburg and Union Mills, and 5 miles of that distance is already covered by the southward branch of the line already constructed at Gettysburg. It will be seen, therefore, that the project of connecting Gettysburg with Baltimore by electric railroad may be realized in the near future. When completed this railroad will not only afford means of transit between Baltimore, the racing grounds at Pimlico, Emory Grove encampment and the growing towns in Carroll and York counties, and easy access to Gettysburg, but it is hoped by the use of express and freight cars, will open up a vast truck and fruit region to supply Baltimore markets.

Similar projects are on foot to connect Catonsville with Baltimore on the southwest, and Ellicott City with the metropolis on the west, as Pikesville, Roland Park, and Towson are already connected.

The Lachine Canal Contract.

The contract for deepening the Lachine Canal is said to have fallen to Messrs. McNamell & Man, the lowest tenderers. This work is estimated to cost about half a million dollars. It is to be completed in three years.



ESTABLISHED IN APRIL 1856.
Published Every Friday.
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The returns of gross earnings for August are, as every one had expected, distinctly favorable. The *Financial Chronicle* in its last issue gives the earnings for 132 roads as \$42,799,261, the increase being about eight-tenths of one per cent. over August of 1893. To be sure the comparison is with a very bad month, the August 1893 earnings having declined 13 per cent. Still, as compared with the course of earnings in earlier months of this year the situation is very encouraging. The July earnings for 128 roads had fallen off 20½ per cent. and in June the loss was 21½, the loss having gone on increasing in every month from January. The August returns, although far from brilliant, are very satisfactory as showing the turn of the tide. To be sure the figures available do not include some of the most important systems, as for instance the C. B. & Q., the Pennsylvania, and the Chicago & Northwestern, which will very likely diminish the apparent increase, but will not destroy the fact that the situation has improved immensely over the preceding months. For the year to August 31 the returns from 126 roads show a decrease of 14 per cent. The preceding year there had been an increase of about 8 per cent. One fact which makes comparisons of current earnings especially encouraging is that in August and September of last year many roads were showing heavy increases of passenger earnings which of course they lose this year. For instance, the Illinois Central is over \$431,000, or almost 23 per cent., behind August of last year, when its World's Fair passenger earnings were very heavy. The New York Central & Hudson River, which also was doing a fine passenger business in August of last year, falls over \$169,000 behind, and the decrease in the earnings of the Rock Island is over a quarter of a million; but when we get away from the roads affected heavily by the World's Fair travel, the increase, as compared with last year, is almost universal.

General Manager Kenly, of the Atlantic Coast Line, has issued a detailed record of the time over his road of the special train for the Knights of Pythias, which on Aug. 26 and 27 ran from Jacksonville, Fla., to Washington, D. C., 781 miles, in 15 hours and 49 minutes; or at an average speed, including all stops, of 49.4 miles an hour. The train consisted of one combination car, one day passenger car and two Pullman sleeping cars. The trip over Mr. Kenly's road, a trifle less than half of the whole distance, was made wholly in the night, and each of the three engines used was an Atlantic Coast Line standard 8-wheel passenger, with cylinders 18 in. x 24 in., and driving wheels 62 in. in diameter. These engines weigh 48½ tons each and burn soft coal. The Atlantic Coast Line, from Ashley Junction, near Charleston, to Clopton, near Richmond, is 386.6 miles long, and the average speed, including all stops, was 52 miles an hour. This includes 10½ minutes after the train was received at the starting point, and before it got away. On the Charleston Division, 95.7 miles, the average speed, including intermediate stops, was 58.3 miles an hour. This time is considerably better than that of either of the rival trains which were run by the two Florida lines last spring, and, in fact, it is the best for a single track road for such a long distance

that we recall. The average speed for the 387 miles noted above was about the same as that made by the East Coast Route between London and Edinburgh, Aug. 31, 1888. The run may also be compared with that from Morristown, N. Y., to New York City, Sept 2, 1891, where the distance and speed were about the same; but both of these runs (which were noted in the *Railroad Gazette* of June 2, 1893) were for most or all of the way over double track roads, whereas the Atlantic Coast Line is, we believe, all single track.

Since writing the above we have received a statement issued by Mr. W. M. Davidson, General Passenger agent of the Plant System, showing the time through to Washington. The rate of speed, as shown by the record, varied but a very little on the different roads, and the principal additional information given by Mr. Davidson is that concerning the number of times the train had to stop or reduce speed for crossings, trestles, drawbridges, etc. Of these there were 50, as follows: 12 stops and 11 slackenings south of Savannah, 11 and 3 between Savannah and Richmond, 7 and 6 north of Richmond. With these delays, the record, brilliant as it is, but partially shows the excellence of the performances, for the speed on the open road must have been very high to make up for the 50 losses, equal to 1 every 16 miles. Mr. Davidson says that the record through to Washington beats the world for a long distance run. Probably this is true, for a single track road, but the Exposition Flyer, which made regular trips all last summer, probably made equally quick runs, though on a road which had two or more tracks practically all the way. The schedule for that train, from New York to South Chicago, 952 miles, was about 49 miles an hour, and it made up time on many trips. On Aug. 31 it made up 66 minutes between Buffalo and Chicago. This was equal to 516 miles in about 9 hrs. 45 min., or 52 miles an hour. As already intimated, we do not state these facts to detract from the credit due to the men who made the Jacksonville-Washington run, but merely to afford interesting comparisons. Besides the disadvantages already mentioned, the fact that the engines had smaller driving wheels than those of the New York Central and the Lake Shore, makes the comparison with the latter unequal.

"Color-blindness is more prevalent than railroad managers think." This is the reported remark of a prominent member of the Traveling Engineers' Association in one of the discussions at the convention in Denver last week. Doubtless it is true of some managers, for some railroads have no examinations to see whether their men are color-blind or not, and we must suppose that the managers "think" there are no men on their roads dangerously color-blind. We cannot assume that managers take this risk deliberately. But the risk is real and it is encouraging to see the Traveling Engineers giving prominence to this subject. The statistics published by Dr. Thomson of Philadelphia, in the *Railroad Gazette* last week show that the missionary field is still very large. But our main purpose in quoting this Denver remark was to point out the absurdity of the position of the railroad manager who goes no farther than to "think" about the prevalence of color-blindness. Why should anyone think, when it is easy to know? Of all the data gathered by the investigators, no fact is more certain and uniformly true than that one man out of 25 is sure to be color-blind, whatever grade or class you select from. All the experts are agreed on this point. If the percentage anywhere is found smaller it will be found that the weeding out process has been partially applied before. But any manager who ignores this plain fact, is yet bound to test his men, because the process is so very easy. The most careless will admit that nearsightedness is common—we know of fast express trains run by nearsighted engineers, either because there has been no eyesight test, or the testing officer has unfairly favored his defective friends—and a test ought to be made for this defect if for nothing more. Once the examiner is on the ground the color test adds nothing to the expense and only a few seconds or minutes to the time. Moreover, any reasonable person can see the entire fairness of the tests, if he will consider them for a moment—hundreds of statements to the contrary notwithstanding. The general lack of accurate information on this subject was illustrated by another remark at Denver, that "many color-blind persons were born so" and that time was not likely to cure the defect. The fact is that practically all color-blinds were born so and that the defect is never got rid of.

Rates on freight from Boston to Baltimore over the Pennsylvania Railroad constitute the latest grievance

of the Philadelphia merchants' committee, who have for several months been trying to detect and stop discriminations against their city. Car-load freight is taken to Baltimore at precisely the same rate as to Philadelphia, and packages—that is, first, second and third-class goods—are delivered free to the store door in Baltimore, the Philadelphia, Wilmington & Baltimore having started free delivery years ago before the road was controlled by the Pennsylvania. We can hardly blame the Philadelphia merchants for being mad at this state of affairs, for it is exasperating to see other people enjoying such fine pickings, especially when we think their good fortune is at our expense. But if the Pennsylvania road answers the Philadelphians by simply asking what they are going to do about it, they may as well submit, for it is not at all likely that the withdrawal of these advantages at Baltimore would help Philadelphia in the least. The heavy freight is probably taken at a low price to get it away from boats. The statement of the Pennsylvania's officers, that the goods are of a kind in which Baltimore and Philadelphia do not compete is probably true. If the railroad gave up the freight the boats would get it, while as long as it goes by rail the railroad company is a trifle richer, and therefore better prepared to do favors to Philadelphia, such as spending \$250,000 on a bridge to facilitate fast time between that city and New York. The free delivery is probably harmless also, as far as the Philadelphians are concerned. If they want that stopped, however, they should try to arouse the boats and competing railroads at Baltimore to attack the Pennsylvania. Free delivery is hardly to be regarded as legitimate railroading in this country—and, indeed, from the constant difficulty experienced in adjusting terminal charges we may fairly doubt whether it ought to be called legitimate in England—but the only way to stop it, in Maryland or elsewhere, is to get the courts to restrict the charter rights of railroad companies more closely to premises on which they have actually laid rails. This would be a hard job and would probably do more harm than good. Moreover railroads forbidden to run delivery wagons could allow for the cartage by discount on the freight bill, and no one seems to have discovered how to prevent secret rebates.

The proposed amendment to the constitution of the State of New York prohibiting free passes passed the constitutional convention by a vote of 96 to 44. It appears below as it passed, shorn of a few unnecessary words but complete in sense.

No public officer or person elected or appointed to a public office, shall directly or indirectly ask, accept, or consent to receive for his own use or benefit or for the use or benefit of another, any free pass, free transportation, franking privilege or discrimination in passenger, telegraph, or telephone rates from any person or corporation, or make use of the same himself or in conjunction with another. A person who violates any provision of this section shall be deemed guilty of a misdemeanor, and shall forfeit his office at the suit of the Attorney-General. Any corporation or officer or agent thereof, who shall offer or promise to a public officer or person elected or appointed to a public office, any such free pass, or discrimination, shall also be deemed guilty of a misdemeanor and liable to punishment as herein provided. No person, or officer, or agent of a corporation giving such free pass or discrimination, shall be privileged from testifying in relation thereto, and he shall not be liable to civil or criminal prosecution therefor if he shall testify to the giving of the same.

The discussion in the convention enabled a good many men to reveal themselves, and a good many more would have done so if they had had more courage or been more cynical. One delegate, for instance, moved that the acceptance of a pass be made punishable by imprisonment for life, for, he said, "no opportunity should be lost to make people honest and virtuous by legislation." Another man who thought this suggestion very funny added to the fun by moving that state officers guilty of accepting passes should be obliged to walk the rest of their lives. Another man thought that the amendment was ridiculous and said that it had been introduced by a man who had been put off a train or refused a pass. Another man thought that the dignity of the state was lowered by the mention of passes in the constitution, and still another offered an amendment providing that the legislature should enact a law requiring free transportation of public officers. The President of the State Liquor Dealers' Association, repeated the very witty motion, which he had made two or three times before, to the effect that the resolution should be amended so as to prohibit treating, and providing that persons treated should not confess the fact. But in spite of all the humor of the gentlemen who want to ride free, the amendment was passed, and now we shall see what the people of the state think about it.

The Proposed Standard Specification for Locomotive Boiler Steel.

Now that the report of the Master Mechanics' Committee on Boiler Steel Specifications has been

thought over, there is, in the minds of those who had hoped for a specification that would be positive and that would declare what is a safe steel to use for fire-boxes and shells and a proper material to buy in large quantities and carry in stock, a feeling of some disappointment, and some of the steel makers say that they are not much better off than they were before, as they do not now know what is really wanted by railroad men, nor what they will accept. It is sometimes convenient to carry a stock of boiler plate to fill hurried orders, and therefore it would be well to know what sort of steel builders and railroad companies would take without much question or discussion. With this specification in front of them steel makers can only be quite sure of making the right product for stock by adhering closely to the maximum requirement of the specifications which now has been adopted by the Master Mechanics' Association. It can hardly be called a standard specification because it has not been agreed to by a majority of the members; it has not been submitted to letter ballot, so that all have not had a chance to vote and the committee do not agree among themselves. What the committee started out to do is stated in the report as follows:

"The specifications should be such as to secure thoroughly good and reliable material; excluding that of inferior quality. It should be sufficiently broad to allow any reputable maker to comply with this requirement. Finally the limits should not be so severe as to unnecessarily increase the cost, which can easily be done without corresponding increase in value.

"In other words, the ideal steel which we might wish to have, is not that which we are likely to get, and concessions must be made from the ideal to make a workable specification."

This plan is obviously a good one, with the single exception of the provision "To allow any reputable maker to comply with its requirements." This provision would better have been left out of the plan, as, taken together with the specifications which the committee have offered, it indicates that perhaps altogether too much consideration was paid to the manufacturer. So long as three or four steel makers could reach a specification at a reasonable cost, the other reputable makers should be encouraged or coerced to bring their plan of manufacture up to a point where they could make the good steel wanted or stop trying to make boiler steel.

The point about which there seems to be the most difference in opinion is the tensile strength. The report says that some of the committee wanted a soft steel ranging from 50,000 to 58,000 pounds per square inch, while others wanted a harder quality from 55,000 to 65,000 pounds. There was a minority report signed by two of the members which reads as follows:

"We agree to all the items of this proposed specification, except the tensile limits of fire-box steel. Believing that this material should be kept soft, and that a hard steel is objectionable on account of its liability to crack in service, we recommend that the minimum ultimate strength be 50,000 lbs., and the maximum ultimate strength 58,000 lbs. per square inch. Some of the members of the committee urged a plea that as the working pressure of boilers had been increased from 30 to 50 per cent. over the previous pressures, and as it was unwise to thicken the fire-box sheet, that a stronger material should be used. We, however, think that an increase in the strength of steel of 10 per cent. will go but a very short way in making up the increase in pressure of 30 or 50 per cent., especially when the risk of cracked sheets and the use of a harder steel are the penalties."

Of course all of the committee know that there is no pressure upon the sheets in the fire-box that requires the tensile strength to be increased even when the pressure is raised to 200 pounds per square inch. Probably there is not a single case on record where the flat sheets of a fire-box have been bulged or torn off the stays, when the bolts were placed about four inches centres, unless the firebox was overheated; in that case it is a question whether the steel having greater tensile strength when cold would stand better than the softer and more ductile material. The action of steel when hot depends more upon percentage of phosphorus and sulphur than upon any of the other ingredients or the tensile strength when cold. It is to be suspected that some have taken the bulging of fire-box sheets between stays, which is common under some conditions, as being the result of weakness. In fact it is solely due to overheating. There is abundant proof that bulging never occurs unless the fire-box sheets are at a considerably higher temperature than steam or water ever reaches in locomotive boilers. It has been pointed out before in these columns that locomotive fires are being forced on some engines now to an extent which will drive the water from the sheets when there is a substantial deposit of scale on the waterside of the sheet. We

use the term "substantial" here now because the necessary thickness of scale to permit the sheet to become overheated under hard firing is not known. but one need not be surprised if it is finally found that so thin a deposit as 1 of an inch will permit overheating when the fires are forced so as to get what is called the "blow-pipe action" as is the case on some locomotives.

In regard to the chemical specification there seems to be in this report a lack of appreciation of the work done before this in selecting proper boiler material, both here and in Europe, and perhaps too much importance is given to the fact that a large number of fire-boxes have given excellent results, although the chemical analysis, made after the fire-boxes had been a long time in use showed the plates then to contain "phosphorus as high as 0.07 of 1 per cent." This is a matter that should be treated with the utmost care in order not to be misled by what are apparently facts and so as to be just to all concerned. The important part of this is that no one knows what the sheet originally contained as impurities. The phosphorus may have been increased in service or the chemical analysis may have included some of the skin of the steel, which may have had a large percentage of phosphorus in the first 0.01 inch of thickness. The "chemistry desired" in the proposed specification is as follows: Carbon, 0.18 per cent.; phosphorus, not above 0.03; manganese not above 0.40; sulphur, not above 0.02; silicon, not above 0.02. The total of the foreign substances mixed with the iron in the steel is 0.65 of 1 per cent. Hence 99.35 per cent. of the material is pure iron. If the reader will plot a diagram representing a section of a sheet $\frac{3}{8}$ of an inch thick he will see that the part of the diagram occupied by pure iron is .37255 inches; manganese occupies .0015 inches; carbon, .00068 inches, silicon, .00008 inches, sulphur, .00008 inches, phosphorus, .00011 inches. With such small dimensions the spaces representing the impurities would hardly be perceptible if drawn to actual scale. The figures for phosphorus represent a distance or thickness too small to be appreciated by the human mind. This illustrates what appears to be an important fact, and that is if there should be in the ultimate superficial skin of the old fire-box which was analyzed, a much increased per cent. of phosphorus, the analysis of the steel as a whole would give an important and vital increase in phosphorus, and it has not been shown that steel does not collect phosphorus and sulphur in this way. To the contrary, it is known that where steel sheets have been heated in furnaces that were previously used to melt phosphor bronze in crucibles, the furnaces retained, even after the action of a fierce fire prior to putting in the steel, sufficient phosphorus, not only to show a high percentage of phosphorus in the analysis but to so affect the sheets as to make them brittle. It is known also that hot iron and steel will absorb phosphorus and sulphur as a sponge takes up water. This is of course an emphatic illustration, but it is one that is used by chemists frequently to call attention to the importance of the affinity of iron for sulphur and phosphorus. Many engineers believe that the superficial skin of steel in a hot fire-box becomes highly heated, say to a depth of $\frac{1}{16}$ of an inch and then it is precisely in such a condition that it will absorb sulphur and phosphorus rapidly, but as the remainder of the sheet is not highly heated the sulphur and phosphorus are not apparently transmitted to the interior of the metal.

Now these are surely very fine theories and may be rightfully considered somewhat speculative and almost too fine for comprehension, yet we are confronted with two important facts, viz.: that the total percentage of phosphorus in any really good steel is not more than 0.05 of 1 per cent. and the addition of a few hundredths more makes the steel practically worthless for boiler steel. These are commercial quantities, so to speak, commonly dealt in by makers and buyers of steel, and yet these quantities are exceedingly minute and this brings us to the second important fact, which is, that the chemist finds it very difficult to make duplicate analyses of steel and are compelled to use very delicate tests to determine the phosphorus and sulphur, and one railroad company found recently that it could scarcely get two analyses to agree when duplicate samples of bars of steel were sent to four different chemists. These remarks are offered as testimony to show that the chemist who analyzes steel after it has been used in a fire-box for a good many thousand miles, takes upon himself the burden of proof and must show that the steel, when put into the fire-box, had practically the same analysis as was found after use, and further must show that the sheet has uniformly throughout its thickness the composition given by such subsequent analyses. It also may be that the

phosphorus added in service to the steel does not produce such a bad effect as the same amount introduced in making. Taking all these questions together it leaves one suspicious about the value of proof as to the effect of phosphorus that is based on the analysis of fire-boxes that have been worn out in service. It appears from the report that the committee were guided considerably by such proof, and therefore many are not ready to conclude that what is ordinarily considered as a high limit of phosphorus is safe in fire-box sheets, although it was shown by the analyses made for the committee "that many of the fire-boxes in the list which gave the highest mileage, had phosphorus as high as 0.07 of one per cent."

Regarding the proper tensile strength for fire-box sheets, the following paragraphs from the report are important:

"The committee endeavored to get positive information concerning the performance of hard and soft fire-box sheets, having at its disposal the tensile test results of several hundred worn fire-boxes, together with the mileages, and as far as it could be obtained, the character of the water used.

"It had also the tensile tests of specimens taken from sheets, both before and after service, from which latter, analyses were made. The tensile strengths varied from 77,000 lbs. down to a little over 50,000 lbs., while the mileages varied from a little under 500,000 to a little over 50,000 miles, and the worn fire-boxes represented all classes of engines and many different brands of steel.

"The results of examination were quite conflicting, but when it is remembered that the treatment of the fire-boxes on the road has probably more effect upon the life than has the original quality, it was what might have been expected. It was soon seen that both hard and soft steel might be found in both the long and short-lived boxes and sometimes in the same fire-box.

"The weight of evidence, however, was toward steel in the neighborhood of 60,000 lbs. tensile strength, giving the best results.

"The tensile tests of sheets, of which there was a record, both before and after service, indicated very strongly a lower strength in the old than in the new sheets, from which we infer that steel of which the rest of the old sheets was made was originally harder than the results appear to show. We are aware that there is in many quarters a prejudice against hard steel as more liable to crack, but offer the suggestion that improved methods of boiler making, such as machine flanging and more intelligent methods of boiler washing, are removing many of the earlier difficulties, and we think that once flanged, the probability is that steel of 60,000 lbs. tensile strength will give better service than that of 50,000 lbs."

The sum of this evidence in the minds of the committee is given in the last paragraph of the quotation. This is to the effect that probably steel having 60,000 pounds tensile strength will give better service than if it has a lower test, but there is not enough evidence to make one feel so sure of the higher test material as to be willing to risk it for locomotives that may be normally used under the good conditions of boiler washing, etc., to which the committee has referred, as the engine may at times, when the road is short of power, be washed with hot water or with cold as may happen to be most convenient. In fact the directions for washing with hot water are not carried out with anything like the fullness with which they are given, and in saying this there are in mind half a dozen cases where the hot water washing is the exception rather than the rule, although the apparatus for hot washing is provided. The new specification permits the use of steel up to 65,000 pounds tensile strength, for fire-boxes, which is higher than has been considered safe unless it was known beyond peradventure that this extra strength was obtained by carbon and not by impurities.

The following are the special requirements for sheet steel given in the report:

- "Tensile strength, 55,000 to 60,000 pounds."
- "Elongation not less than 20 per cent. in eight inches."
- "Test pieces having rough edges removed by filing, grinding or machining, shall, with annealing, bend over on itself, both while cold and after being heated to a cherry red, and dipped in water at 80 degrees F., without showing cracks or flaws on outer edge."
- "No chemical requirements."

In the directions for cutting off the specimens for tests, nothing is said about the direction in which these specimens shall be cut, whether crosswise or lengthwise of the rolling of the sheet, and yet there is a wide difference in the test made crosswise of sheets rolled from a single bloom, especially those from near the top of the bloom. Some locomotive builders have been very careful to insert the word "lengthwise" in their specifications for boiler steel so that they may not be bothered by inquisitive inspectors when sheets are not ductile crosswise of the grain. Most European specifications and many in this country have a physical test of bending crosswise and many cases of actual tests have shown that not infrequently among a lot of sheets of good steel there will be found one or more that are very defective crosswise and yet are

good lengthwise of the rolling. This is particularly so unless the sheets are cross rolled or well hammered before rolling.

If any such complete physical tests had been given for shell steel as are commonly given by engineers, such as drifting, repeated bending and the like, there would be more satisfaction with the shell specification and the absence of chemical requirement, but as it is it would appear that the shell specification is defective in permitting too wide limits. Much tank steel is sold in this country at very low prices that will meet the shell specification and yet no conservative constructor would use that steel in such important work as locomotive boiler shells.

To reduce the shell specifications to a simple statement of the maximum requirement is to bring them into a clear light for examination and criticism. When so set forth it is:

Steel will be accepted for shells of locomotive boilers having a tensile strength of 65,000 pounds, an elongation of 20 per cent. in eight inches, provided smooth specimens without annealing will bend over on themselves both cold and after being heated to a cherry red and dipped in water 80 degrees F. without showing cracks or flaws on the outer edge. This is regardless of chemical composition and without a drifting test or crosswise bending test.

The firebox steel specification, when simply stated in its maximum limit is:

Firebox steel for locomotive boilers will be accepted for $\frac{3}{8}$ plates having a tensile strength of 65,000 pounds, an elongation of 22 per cent. in eight inches with phosphorus $\frac{3}{100}$ of one per cent., manganese $\frac{1}{100}$, silicon $\frac{1}{100}$, sulphur $\frac{4}{100}$ -100, provided the specimens lengthwise of the sheet will stand the bending and quenching test given for shell steel, and further provided that there are no seams or cavities shown by the nicking test more than $\frac{1}{4}$ inch long.

It should be remembered that these are the lower limits of quality, and in justice to the report it should be said that it is specifically stated that what is desired is a much better material, and there is a specification for this, which is: 60,000 pounds tensile strength and 28 per cent. elongation in eight inches. Phosphorus not above $\frac{1}{100}$ of 1 per cent., manganese not above $\frac{1}{100}$, sulphur not above $\frac{1}{100}$ and silicon not above $\frac{1}{100}$.

It is fortunate that this specification was adopted, as it will form a nucleus around which to construct a set of requirements that will be more definite and safe to follow, but it is highly probable that there will be some important changes next year, and then the resulting specification should be referred to letter ballot so as to get an opinion from a majority of all of the members instead of those alone who attend the convention and vote.

Annual Reports.

Louisville, New Albany & Chicago.—The annual report of this company for the fiscal year ending June 30, is made public. Its affairs are of particular interest because of the slow, but apparently safe, process of rehabilitation which began in 1891, when the present management took control of the property. The length of line operated remains practically the same; that is, 537.11 miles. The main results of operation in the last two years have been:

	1894.	1893.	Decrease p. c.
Gross earnings.....	\$3,195,883	\$3,490,888	8.21
Op. Expenses.....	2,118,611	2,355,865	10.78
Net earnings.....	1,077,272	1,135,023	4.09
Ratio of expenses to earnings.....	62.56	64.36	.....
Fixed charges.....	999,286	954,841	.....
Surplus.....	77,985	180,182	.....

The gross earnings in 1892 were \$3,067,108 and the net \$952,159; in 1890 they were \$2,630,132 and \$999,253.

In 1894 a dividend of 1½ per cent. was paid on the preferred stock, amounting to \$57,252.

The principal changes in earnings were a considerable gain in passenger earnings and a heavy loss in freight, which was to have been expected, for this road was one of those most affected by the World's Fair passenger business, having carried many excursion passengers long distances. The items of earnings from freight and passenger traffic were as below:

	1894.	1893.	Per Cent.
Passenger.....	\$1,092,397	\$886,754	Inc. 23
Freight.....	1,822,365	2,321,093	Dec. 21

The other items of income did not vary in any important degree except that there was an increase of \$14,000 in dividends from the Chicago & Western Indiana. The passengers carried declined by about 51,000; the total in 1894 having been 930,216, but the average journey increased from 46.62 miles to 77.64 miles, the greatest increase that we have noticed, and the earnings from each passenger increased from 88.35 cts. to 117.53 cts. The rate per passenger per mile fell from 1.895 cts. to 1.512.

The tons of freight carried diminished by 300,000 to 1,439,673. The average haul increased one mile only, and the rate fell from 0.883 cent to 0.831; so that the earnings per ton were \$1.27 as against \$1.33.

The receipts and expenses per mile of road were as below:

	1894.	1893.
Gross earnings.....	\$5,950	\$6,499
Op. expenses.....	3,944	4,386
Net earnings.....	2,006	2,113

The saving in operating expenses was distributed over all the items; that is, maintenance of way and structures, maintenance of equipment, conducting transportation and general expenses, all show savings which were due, doubtless, as in the case of so many other railroads, to two causes, less business to be done and rigorous economies.

There is about \$590,000 of debt in the form of equipment notes, maturing during the next six years, and it was intended that the preferred stock in the treasury should provide for this; but prices having declined to what the directors feel to be far below the value of this stock, it has been decided to issue \$1,000,000 in 20-year, equipment, sinking fund bonds, these to be issued from time to time as the equipment notes must be taken up.

The President says that three years ago the track was mostly iron rail without ballast, with meagre equipment and terminals, without shops, with light wooden bridges and with more than two millions of debt due or speedily maturing. Now the physical condition of the property is such that the urgent requirements of the company are confined to replacing light rails between Monon and Indianapolis; widening the gage of the Switz City branch, using the light rail taken up from the main line, and gradually completing the ballasting of the main line. He adds, that in comparison with what has already been accomplished, the work remaining to be done seems trivial. The main track now is entirely laid with steel rail, except about 35 miles of narrow gage. Of this, 153 miles is 67 lbs.; 142 is 60 lbs.; 68 miles is laid with 56-lb. and 113 miles with 52; 510 miles of the line is ballasted. Of this, however, 263 miles is ballasted with earth, 185 with gravel, 49 with cinders and 14 with stone. New shops are being built at La Fayette and will be in operation early next year, and new freight yards are being constructed at that point.

The Wabash Railroad Company.—The fifth annual report of this company is for the year ending June 30, 1894. The mileage operated was 2,592 miles, being 16 miles more than in the preceding year. The chief results of operation are as follows:

	1894.	1893.	Decrease p. c.
Gross earnings.....	\$12,551,449	\$14,220,444	12
Operating expenses.....	9,830,381	10,807,604	9
Net earnings.....	2,721,068	3,412,840	20
Per cent. op. expenses.....	78.32	76.0	.....
Gross, per mile.....	\$6,485	\$7,524	.....
Expenses per mile.....	5,079	5,718	.....
Net per mile.....	1,406	1,806	.....

The causes of the decreases in gross and net and operating expenses are the familiar ones, and we need not repeat them. The net profits applicable to interest were \$2,187,666, and the interest on bonds and rent of the Eel River Railroad amounted to \$2,859,431, leaving a deficit of \$671,766. In the preceding year the surplus had been \$247,580, making a total difference in the profit of \$919,346.

The earnings from various classes of business were as below:

	1894.	1893.	Inc. or Dec. p. c.
Freight.....	\$7,656,892	\$9,617,588	D 20
Passenger.....	3,946,011	3,558,633	I 11
Mail.....	416,291	404,705	.....
Express.....	326,374	380,936	.....
Miscellaneous.....	205,882	258,592	.....

The number of passengers carried in 1893-4 was 3,724,674, being more than 210,000 less than in the preceding year. Nevertheless, the passenger-miles were about 210½ million and were over 33 million more than in the preceding year; that is, the journey increased from 45 miles to 56½, and the average earnings per passenger increased from 90 cents to \$1.06. The average fare per passenger-mile decreased from 2.009 cents to 1.877. The report assumes to give average expenses per passenger-mile and net earnings for the same unit, and figures out the net earnings per passenger-mile as 0.369 of a cent as against 0.282 of a cent in the preceding year. The same bookkeeping appears in the freight statistics and the average profit per ton-mile is given as 0.091 of a cent in 1894 and 0.133 in 1893. Of course we need not point out that this division of expenses and consequent nice discrimination in profits is purely arbitrary; but it will gratify the statistician of the Interstate Commerce Commission and will perhaps do no harm.

Of course the Wabash suffered severely from the coal strike in May and June. Bituminous coal was nearly 23 per cent. of the total freight tonnage of the company in 1893; in 1894 it fell to less than 21 per cent. of the total. Moreover, the company had to pay more for engine fuel during the strike. This accounts for a considerable part of the loss in earnings, although the depression affected earnings in all directions. Two serious passenger train accidents neutralized any profit that the company might have derived from the great passenger business of the last six months of 1893. The charges to operating expenses under the item of injuries to individuals amounted to nearly \$142,000, an increase of \$45,000 over the preceding year. The item of loss and damage to property and goods was \$150,000, being an increase of \$30,000. The other items under this head of the account were all reduced.

Railroads often have themselves largely to blame when the law-makers try to reduce the profits on transportation, and the recent action of the all-rail lines between Indianapolis and Chicago seems to be another illustrative instance. They have been furiously fighting the Lake Erie & Western on excursion business, because that line had the temerity to compete for this business to Chicago via Michigan City, and thence via boat at a rate of \$3.50 for the round trip. While it is possible, as is claimed, that the all-rail routes have forced the Lake Erie & Western to carry passengers from Indianapolis to Michigan City and return for nothing, that road has refused to go out of the business and the result has been that instead of one or two small excursions being run, such low rates have been made that a large share of the shoppers of Indianapolis have been carried to Chicago and back during the past four weeks. This has incensed the local merchants at Indianapolis, who now threaten to retaliate on the roads by petitioning the Legislature of Indiana to fix a maximum passenger rate of 2 cents a mile. The Legislators will assume, as a matter of course, that abundant proof has been furnished that a local rate of 2 cents a mile is remunerative, for have not the roads themselves voluntarily made rates less than 2½ mills a mile. This territory would seem to be a good field for some missionary to go into and propagate the doctrine that the roads west of Chicago are trying to live up to, that only the President of the road should reduce rates. If it is answered that these cuts were ordered by presidents, why, we suggest that those officers be supplied with pressure-governors, so that in wielding the axe they will make the blows milder and less frequent. If, by some magic, all hands could be induced to try Josh Billings' rule in gambling, to never venture more than half a dime at a time, there would be hope that a truce could be arranged before bankrupting a city full of storekeepers.

We are surprised to learn through the always reliable medium of the Associated Press dispatches, that the Rock Island is making a regular business of rain-making. Rumors of this new departure have reached us from time to time for several months; but it is only now that we have any specific information. The story goes that the plant of the rain-making department consists of three cars which are placed at the points of a triangle about 25 miles apart. In these cars and connected with them are certain vaguely described jars of chemicals, electric batteries and other apparatus by which "volumes of gas are produced, which, after ascending somewhere from 4,000 to 8,000 ft., turns cold instantly and causes a vacuum, thus attracting the moisture." If by high winds the gases are blown into the next county, the rain may fall in the wrong place; therefore the operators claim credit for any shower within a radius of 50 miles. We are astonished that the manager of the Rock Island should thus attempt to undermine Uncle Jerry Rusk in the affections of the Kansas farmers.

NEW PUBLICATIONS.

The Science of Railways; with Illustrations of the Inception, Growth and Evolution of Primitive Transportation. By M. M. Kirkman. Chicago: The World Railway Publishing Co., 1894. 12 vols. Octavo. About 5,500 or 6,000 pages in all; 1,700 illustrations and ample index. Price, \$30.00.

It is not necessary to introduce the Second Vice-President of the Chicago & Northwestern Railway to the readers of the *Railroad Gazette*; not to know him is to confess one's self unknown. Any time the last dozen years we have reviewed his books, which are known from one end of the land to the other. Therefore, what manner of man he is and what he is likely to say on railroad subjects, a great many of our readers already know. In the work now before us he has rounded up and completed the literary work of his life, or at least he thinks he has, and has called in all former volumes, considering that everything that he has written on railroad matters is properly and sufficiently replaced by the dozen volumes collected in this one work. We say he thinks that he has rounded up and closed his literary life so far as railroads are concerned. We question very much if he has, however, for he is too young and active to be content to stop now. However, the work now published is a sufficient monument.

The 12 volumes are entitled Organization and Forces; Finance, Building and Maintaining; Operation of Trains; Passenger Business; Freight Business; Baggage, Express and Mail Business; Economical Purchase, Care and Use of Material; Economy of Rates, Private versus Government Control; Fiscal Affairs, Disbursements; Fiscal Affairs, Collection of Revenue and the Principles Governing It; General Fiscal Affairs, and finally, vol. xii, Fiscal Duties of Agents and Conductors, and a general index of the whole set. The index itself is quite extraordinary, filling 212 pages. Scattered through these volumes from the beginning to the end, are illustrations showing the methods of carrying and of traveling in all ages and in all countries, going back as far as Mr. Kirkman has been able to go with the help of histories, encyclopedias and monuments. These illustrations are not referred to in the text, the theory being that their titles are sufficiently explanatory. They are doubtless interesting and lighten up the volumes, but we would far rather they had been lumped together in a volume by themselves. It is annoying to undertake to read closely a few

pages on the complicated and delicate relations of the railroads and the State and have your mind suddenly led away by the interjection of pictures of women carrying paposes and of elephants in armor. But still perhaps there are more people who like this kind of thing than there are who do not like it.

Of the subject matter it seems hardly necessary to say much, it being chiefly a rewriting and extending in some points and compressing in others, of the material which has appeared in Mr. Kirkman's former books, and, like all of his earlier books, the treatise has the defects of its virtues; that is, the specific information is intermixed with a great deal of general knowledge and of philosophical comment, which makes interesting reading and suggests and instructs in a thousand ways, but often bothers the man who is after precise information. Still there is a great deal of just that precise information—a greater variety in fact than is collected anywhere else in one treatise.

Proceedings of the Master Car Builders' Association, 1894.—The 1894 Proceedings, that is, of the Saratoga meeting, are now issued and may be had of the Secretary, Mr. John W. Cloud, The Rookery, Chicago.

By the way, we take this occasion to protest against the modesty which keeps the Secretary's name and address off the title page or off the page next following the title page. We consider it modesty misplaced, for unless one happens to know who the Secretary is and where he is; or happens to know that a complete list of officers is published somewhere towards the end of the volume, he will have a hard time finding out how to communicate with the Association. The Master Mechanics' annual volume is better off in this point and nobody is made unduly prominent by the fact.

This year's volume is an interesting one and contains some unusually important reports; but the scope of these reports has already been made very familiar to the readers of the *Railroad Gazette*.

Journal of the Association of Engineering Societies, August, 1894. John C. Trautwine, Jr., Secretary, 419 Locust street, Philadelphia.

The August number has an interesting table of contents. A paper on the Lining of the Mullan Tunnel we reprint in this issue at once, it being a very clear and business-like account of this important work. Another paper is on the Manitou & Pike's Peak Railway by Mr. Thomas F. Richardson, which is also an excellent paper, quite detailed and carefully prepared. A shorter paper by Mr. A. E. Cumming is on the West Gallatin Irrigation Canal in Montana; and another one, short but good as a matter of record, is on the Manchester Ship Canal, by John Dean. The Index to Current Literature appears as usual. The engravings in the journal as well as the typography are now excellent.

Statistics of American and Foreign Iron Trades for 1893. Philadelphia; the American Iron & Steel Association, James M. Swank, Secretary, 1894.

This is the familiar annual statistical report of the American Iron & Steel Association and gives statistics of the American iron trade for 1893, and the years immediately preceding, a brief review of its present condition and also statistics of the iron and steel industries of foreign countries. It is a pamphlet of 78 pages, made up chiefly of figures which are authoritative.

TECHNICAL.

Manufacturing and Business.

The E. W. Bliss Co., of Brooklyn, N. Y., report recent sales of quite a number of machines to European firms. Tools for watch and clock making, have been shipped to the most prominent makers in Switzerland, Germany and France. These orders have been for special watch makers' drop bars and punching presses, and other special machinery for watch and clock making. From Austria orders have been received for several toggle drawing presses, and six power presses of different sizes. A large improved automatic perforating press is now nearly completed, and will be shipped to England for the manufacture of perforated metals up to 50 in. in width.

The Arkansas Central Construction Co. has filed a charter in Arkansas, with a capital of \$500,000. Its incorporators are: P. C. Ewing, Howell Jordan, Zeb Ward, P. E. Brugman, Zeb Ward, Jr.

The courts have ordered the Receiver of the Mt. Vernon Bridge Co. to sell the plant to liquidate the company's indebtedness. The plant cost about \$78,000.

The National Structural Tubing Co. is now successfully manufacturing square pipe at the Mahoning Rolling Mill, Danville, Pa. Both the North Branch Steel Works and the Montour Iron & Steel Works, that town, are in full operation, the former being on 90-lb. rails for a street railroad.

The Mather Electric Co., of Manchester, Conn., reports the following orders among others sent in during the last few days by their agents: Complete motor equipment for the Phelps' Publishing Co., Springfield, Mass., which will operate its immense factory by electricity; one 100-light dynamo to Meridian, Miss.; two 60kw. m. p. generators for Columbus, O.; one 80-h. p. m. p., for Sand Run, Ohio; one 80-h. p. m. p. for New Pittsburg Coal Co.; Complete lighting plant to Calumet Elevator Co., Chicago; one 125-h. p. direct connected street railway generator to the South Chicago City Railway Co.; one 10-h. p. motor of the Manchester type, to B. F. Sturtevant Co., Chicago. J. Holt Gates, Monad-

nock Building, Chicago, General Western Agent, reports more inquiries during the past two weeks than were received for the previous three months.

The Cleveland Dry Dock Co., of Cleveland, O., has issued \$100,000 in bonds, due one-half in ten years and the other half in fifteen years, which have nearly all been subscribed by the stockholders of the company. These bonds were issued to pay for the recent extensive improvements on the company's docks at Cleveland. The bonds are secured by a mortgage on real estate at Cleveland, and the dry docks, machinery and other property of the company.

At the annual meeting of the National Tube Works Co., held in Newark, N. J., last week, the old directors were re-elected. The directors after the annual meeting re-elected the former officers. All departments of the mill are now running upon orders and the outlook for the immediate future is promising.

The Bullard Machine Tool Co., has been incorporated in Connecticut with E. B. Bullard as president, to succeed to the business of the Bridgeport Machine Tool Works, of which Mr. Bullard was proprietor. The new company will continue the manufacture of the machine tools as heretofore.

The Edward P. Allis Company of Milwaukee, has now over 1,800 men at work in its different departments. It is interesting to note that the present great plant has developed from a small shop, established for the manufacture of flour mill machinery. The works were gradually enlarged, until at the present time they build the largest machinery and engines. The present company was incorporated in 1889, and has a capital of \$1,500,000.

Iron and Steel.

The Lackawanna Iron & Steel Co., purchaser of Robert H. Coleman's assigned estate, will add a large and improved iron furnace to the plant at Cornwall, Pa.

The Homestead Steel Works resumed on Sept. 17 in all departments. The 35-in. mill was put on double turn. The Edgar Thomson Steel Works will run only five days a week, until further notice.

Extensive improvements at the Johnson plant, Johnstown, Pa., that will materially increase the present force of about 1,800 men by the end of the present year, are in contemplation. The plant has all the work it can conveniently handle until the close of the year.

These directors of the Thomas Iron Co., Hokendauqua, Pa., were re-elected at the meeting on September 11th: Samuel Thomas, Charles Stewart, James W. Fuller, William Hullick, William P. Hardenberg, B. F. Fackenthal, Jr., and Fred R. Drake. B. F. Fackenthal, Jr., was re-elected President of the Company and James W. Weaver Secretary and Treasurer.

The frog, switch and signal department of the Pennsylvania Steel Works at Stelton, Pa., last week received one of the largest contracts for work in its history. It is for several miles of electric railroad work, including frogs, switches, crossings and turnouts for a traction company at Bridgeport, Conn. The department is still at work on Philadelphia Traction Co. material.

The immediate outlook for the iron and steel industries in the Pittsburgh district is bright. Railroad interests are responsible for an increased amount of business, most of the orders being for materials to make repairs to rolling stock. Operations at the Spang Steel Works at Etna, Pa., will be delayed at least two weeks through the wrecking of the blowing engine in the Clapp-Griffiths department last week. The L. M. Morris foundry, Pittsburgh, has been awarded the contract to furnish 1,700 tons of structural material for new buildings in Pittsburgh.

New Stations and Shops.

The Milwaukee Bridge & Iron Works, has a contract for erecting the iron roof of a new boiler shop, 150 ft. x 250 ft., for the S. Freeman & Sons Mfg. Co., of Racine, Wis. The building will be of brick with an iron truss roof and will have an electric traveling crane with a 45 ft. span.

The Boston & Maine repair shops at Salem, Mass., which were recently destroyed by fire, are to be rebuilt immediately. In fact the work has already commenced.

There is some talk of the Pullman Co. removing its St. Louis shops to Montrose avenue in that city, where it owns a large tract of ground which was secured through lease and purchase some months ago. The present shops are said to be too small for the demands made upon them, and as no enlargement can be made at the present location the removal to Montrose avenue and the building of new shops is suggested.

The Chicago, Burlington & Quincy has built a new 10-stall roundhouse at Sheridan, Wyo., on its Northwestern extension. A considerable amount of new machinery is to be purchased for the repair shop at that town.

Car Heating.

A conference of officers of the Central of New Jersey, the Baltimore & Ohio, the Reading and the Pullman companies was recently held, at which it was agreed to take off the Gibbs' coupler and put on the Gold. Each of the three railroads was represented by a high officer of the transportation department, and by one from the mechanical department. The action of the Pullman Company applies only to the cars in the "blue line."

The Union Railroad of Providence, operating 120 miles of road and about 200 cars, has awarded the contract for the electric heating of all its cars to the Consolidated

Car Heating Co., of Albany, N. Y. This we believe is the largest electric car heating order ever given.

Interlocking.

The National Switch & Signal Company has closed contracts through Mr. George Gibbs, Mechanical Engineer of the Chicago, Milwaukee & St. Paul for interlocking two crossings of that road with electric street railroads in Chicago. The apparatus and arrangement to be used is that devised by Mr. Gibbs and illustrated in the *Railroad Gazette* of February 23, 1894, for cutting out the power current on the electric railroad, when the crossing is open for the steam railroad.

Electric Selectors on the B. & O.

The Baltimore & Ohio has given an order to the Electric Selector & Signal Co., 45 Broadway, New York City, for some of its instruments for use at small stations on the main line. These instruments, described in the *Railroad Gazette* of August 28, 1891, consist of a loud call bell, to be set ringing by the selector, and which will continue to ring until the operator answers; a selector which acts when a certain combination of dashes is sent over the wire; and an "answer back," which transmits a signal assuring the calling office that the call has actually been sounded. The dispatcher's office, by having a distinctive combination of dashes for each office can thus call up any one without disturbing the bells at the other. These instruments have been tested several months by the Baltimore & Ohio on long circuits.

THE SCRAP HEAP.

Notes.

A committee representing the "Pullman Co-Operative Club," said to be an organization of ex-employees of the Pullman shops, has been visiting various towns in Kansas, including Topeka, seeking encouragement in the establishment of a factory. The plans of this club seem to be rather vague; they propose to manufacture "anything from a mirror to a sleeping car." The club owns patents on a sleeping car, a coffin, a bicycle sprocket wheel and an electric brake for railroad trains.

The Lake Street Elevated Railroad in Chicago refuses to report the value of its property to the Secretary of State, under the tax law, on the ground that the company is not a common carrier.

A derailment on the New Orleans & Southern road a week or two ago resulted in the death of two persons, and a Grand Jury, investigating it, recommends that passenger traffic on the road be suspended until the track can be repaired.

Several members of the American Railway Union who have been under arrest at Indianapolis for several weeks, were discharged on Sept. 14, and of all those tried at Indianapolis, it appears that only two were found guilty—Hiram Angler, President of the American Railway Union at Ashley, Ind., and Arthur Desheno, who led a riot at Hammond. Desheno's sentence was only 20 days. At Minneapolis last week, Judge Nelson, of the United States Court, dismissed the cases against 15 strikers arrested at Willmar, Minn., and released the prisoners. He held the indictments defective.

The Lake Shore and the Rock Island roads have begun a brisk campaign against men and boys who steal rides on their trains within the city limits of Chicago, and on Sunday last 224 of the offenders were arrested. Thirty-three of these were sent to the Bridewell on fines of \$5 and costs, a few were released, and the others were held to appear later in the South Side Police Court.

The Chicago, Burlington & Quincy has built a new 10-stall round house at Sheridan, Wyo., on its Northwestern extension. A considerable amount of new machinery is to be purchased for the repair shop at that town.

The car wheel department of the new plant of the Memphis Car & Foundry Co., located at Birmingham, a suburb of Memphis, Tenn., has started up. This department has a capacity for turning out 250 car wheels a day. Mr. Maris, of the Memphis plant, states that about 150 men have already moved from the plant at Litchfield, Ill., to the Memphis works. The company has the contract for repairing a number of cars for the Kansas City, Fort Scott & Memphis, and a small order for new cars.

The Atlanta Exhibition of 1895.

The plans and specifications for the buildings of the Cotton States and International Exposition at Atlanta, Ga., are now being prepared by Mr. Bradford L. Gilbert, 50 Broadway, New York City, the supervising architect. The plans will be ready about October 1 for contractors to estimate upon and prepare tenders for the erection of the buildings. Mr. Grant Wilkins, C.E., of Atlanta, is chairman of the grounds and buildings' committee and will give any further information to contractors.

Recognition of Mr. Tweddell's Work.

The Franklin Institute, through its Committee on Science and the Arts, has recommended the award of the John Scott Legacy Medal and Premium to Ralph Hart Tweddell, of London, Eng., for his Improvements in the Application of Hydraulic Pressure to Machine Tools.

The Congo Railroad.

Twenty-five miles of the Congo Railroad, forming the first section between Matangé and Kengé, are now completed. The work has cost \$100,000 a mile. The line will be 93 miles long in all, and will connect the immense waterways above Stanley Falls with the sea.

Improvements at Port Richmond.

The engineers of the Philadelphia & Reading Railroad are now engaged in preparing plans for some important improvements at Port Richmond which are intended to shorten the time taken in handling coal at that terminal.

the Board having no power to let the contract without giving other firms an opportunity to bid.

Lake Freight Matters.

Two large lake ships have just been launched at Cleveland, one by the Globe Iron Works Co., on builders' account and one by the W. L. Nicholas, by the Cleveland Shipbuilding Co. Both are of capacity for 4,000 tons on moderate draught. At the same time a contract has been closed for the largest freight ship on the lakes, 370 ft. long over all, beam 44 ft., depth 26.3 ft. This will be a 5,000 ton vessel, and the F. W. Wheeler Co., of Bay City, will build it.

During August 500,000 tons of coal were landed at dock at the head of Lake Superior, by far the greatest quantity ever known. It is expected that a total of 1,750,000 tons will be received there this year, a decrease of 300,000 tons from 1893. Last spring there were 150,000 tons on hand, against nothing in the spring of 1893, so the net decrease is small.

By reason of the rapid rise in lake freights from the head of Lake Superior, wheat from 1 1/4 to 2 1/2 cents, or from 60 to 90 cents, lumber from \$1.62 to \$2.00 and coal from 20 to 50 cents, business has been curtailed and will be still more so. Several of the largest ore mining companies, including the Minnesota, which has mined and shipped over 1,000,000 tons this season already, will probably restrict shipments to their own vessels.

The Debs Contempt Case.

The testimony in the contempt proceedings against E. V. Debs, et al., has all been introduced and an adjournment taken until September 25, when both sides will make oral arguments before Judge Woods. Counsel for both sides have also agreed to prepare and submit abstracts of the evidence, also printed briefs, before October 4; the defense to have an additional 30 days in which to submit arguments in the Santa Fe branch of the case. The concluding evidence submitted by the prosecution consisted of testimony by various Western Union operators and messengers tending to fix upon Debs the sending and receipt of certain telegrams. The prosecution think that it has done so, but the defense will undoubtedly argue a failure to connect Mr. Debs with any of the telegrams and orders that were sent after the injunctions became operative. The evidence of several newspaper reporters was also introduced by the prosecution concerning interviews with the defendants. The attorneys for the Santa Fe introduced evidence to show the effect of the strike upon that road, and to prove that employees were intimidated by the defendants.

LOCOMOTIVE BUILDING.

Two heavy passenger engines for the Boston & Albany have just been turned out of the shops of the Schenectady Locomotive Works. They are to haul trains of six sleeping cars on the third and fourth divisions, where there are some 80 ft. grades. They have tenders holding 4,000 gallons of water, so that they can run 50 miles without replenishing the supply. The principal dimensions of the engines are: Cylinders, 19 in. x 24 in., driving wheels, diameter, 69 in., boiler, diameter, 60 in., steam pressure, 180 lbs. There are 298 tubes 11 ft. long; the firebox is 40 in. x 90 in., and the grate surface is 25 sq. ft. The weight of each engine is 59 tons of which 37 tons are on the drivers.

CAR BUILDING.

The Youngstown Car Works last week sent a lot of 76 platform cars over the Pittsburgh & Western and Baltimore & Ohio to New York City, where they are to be loaded on steamer for shipment to Havana, Cuba.

The Barney & Smith Mfg. Co., Dayton, O., has an order from the West Side Metropolitan Elevated Railroad Co., of Chicago, for 55 passenger cars, and an order from the Cleveland, Cincinnati, Chicago & St. Louis for 44 cars.

The Madison Car Co., as anticipated in a note in this column two weeks ago, started up its plant at Madison, Ill., on September 11, employing about 600 men. The shops, as already stated, have been closed since 1893, when an assignment was made to P. A. Fusz, Vice-President and Treasurer of the company. The plant and machinery have been overhauled during the long shutdown, and the property is now in good condition. The company has been reorganized, the present officers being as follows: M. L. Rumsey, President; C. D. McLure, Vice-President; Paul A. Fusz, Second Vice-President and Treasurer, and A. P. Brigham, Secretary.

BRIDGE BUILDING.

Alexandria, Va.—The County Supervisors have awarded the contract for an iron bridge at Terrison's Crossing of Four-Mile Run to the Canton Bridge Co., of Canton, O.

Augusta, Ga.—Plans have been prepared for the erection of a new iron bridge over the canal at Fifteenth street. Part of the contract for furnishing iron work has been awarded to the Geo. R. Lombard Co. The bridge will be 162 ft. in length, the middle span being 54 ft., the others 53 ft. 10 in. each. The span will rest on iron piers filled with concrete. The height of the bridge will be 7 ft. The cost will be about \$4,854.

Buffalo, N. Y.—The Western New York & Pennsylvania has recently prepared plans for building about nine new iron bridges on its Pittsburgh division. Bids for this work have been received by the company's officers, but the contracts have not yet been given out.

Chemung, N. Y.—The New York, Lake Erie & Western is to have a new iron bridge across the river at this place.

Clelland, W. Va.—The County Court of Kanawha County, W. Va., on Friday last opened bids for building a new steel highway bridge over the Elk River at Clelland. The following are the bids: The first figures being for the bridge with wood joists; the second with steel joists: Toledo Bridge Co., \$14,890 and \$15,667; Detroit Bridge & Iron Works, Detroit, \$15,150 and \$15,700; Edmund Thacher, Louisville, \$14,627 and \$15,125; Champion Bridge Co., Wilmington, Ohio, bridge complete, wood joists \$14,750; Variety Iron Works, Cleveland, \$14,711 and \$15,211; Indiana Bridge Co., Muncie, Ind., superstructure of bridge alone, \$8,850; with addition of \$730 for iron lattice hubgards and steel joists; Bracket Bridge Co., Cincinnati, \$14,775 and \$15,275; Columbus Bridge Co., \$15,500 and \$16,275; Canton Bridge Co., Canton, Ohio, \$12,300 and \$12,500; Groton Bridge Mfg. Co., Groton, N. Y., \$14,600 and \$15,050; King Bridge Co., wood approaches, \$15,750, iron approaches \$16,275.

After the bids had been considered, the work was separated, and the superstructure given to the Canton

Bridge Co., at \$7,806, and the sub-structure to J. W. Topping, of St. Albans, W. Va., at \$7,000, total, \$14,806.

Columbus, O.—A bridge is to be constructed over the Olentangy River at West Goodale street, in this city, to cost about \$50,000. The bridge has been projected, but owing to the opposition of a large property owner no active steps have been yet taken to invite bids.

Helena, Mont.—The County Commissioners have awarded the contract for the superstructures of the two new bridges over Ten-Mile Creek to the King Bridge Co., of Cleveland, O., for \$2,341 for both structures. One of the bridges will be over Ten-Mile Creek, near the Broadwater Hotel. It will be a one-span bridge 65 ft. in length, with a 24-ft. roadway and two 5-ft. walks. The other bridge will be over Ten Mile at Montana avenue, with a single span 65 ft. long, with a 22-ft. roadway, and no foot walks. Both will be low truss iron bridges. There were 18 bids for the iron work.

Muscoda, Wis.—Two spans, each 150 ft. long, of the bridge across the Wisconsin River at this point were carried off the piers in a recent windstorm, which did much damage in the town.

Philadelphia.—Bids have been invited by J. T. Richards, Engineer of Maintenance of Way of the Pennsylvania Railroad, for the construction of a five-pier stone bridge on the Columbia & Port Deposit branch across Conestoga Creek at Sag Harbor. The new bridge will displace a wooden structure.

Somerset, Pa.—Two wooden bridges in Jenner Township were swept away during a recent storm. They will likely be replaced by iron structures.

Sykesville, Md.—The commissioners of Carroll and Howard Counties have received bids for a new steel bridge across the Patapsco River at this point, from H. A. Ramsay, Baltimore; Pittsburgh Bridge Co., Oswego, N. Y.; Toledo Bridge Co., Harrisburg, Pa.; Campbell & Zell, Baltimore; R. Hood Co., Washington, D. C.; King Bridge Co., H. J. Sturb & Co., New Jersey; Wrought Iron Bridge Co., Canton, O.; Schuykill Bridge Co., Pennsylvania. H. A. Ramsay and the Toledo Bridge Company were the lowest bidders, but the award has not been made.

Toledo, O.—The following bids for the construction of the bridge over Swan Creek on St. Clair street were opened last week: Youngstown Bridge Co., \$25,400; N. Henahan and S. Buehler, \$24,997; Toledo Bridge Co., Plan No. 1, \$23,500; Plan No. 2, \$19,500; Plan No. 3, \$20,500; Massillon Bridge Co., Plan No. 1, \$25,975; Plan No. 2, \$37,000; King Iron Bridge Co., Cleveland, \$24,950; Variety Iron Works, Cleveland, \$20,600; Ohio Bridge Co., Toledo, Plan No. 1, \$21,700; Plan No. 2, \$24,000.

Valley Railroad.—In the United States Court, at Cleveland, last Saturday, Receivers Keim and Monseratt were authorized to issue \$25,000 worth of receivers' certificates for the purpose of building six new bridges to take the place of wooden structures, to pay off several pressing claims, and to buy new rails.

Yankton, S. D.—The plans of the Yankton Bridge Co., for a combined railroad and wagon bridge across the Missouri River at Yankton, have been approved by the Secretary of War, so that the company can now go ahead with the erection of the structure. R. J. Campbell, President of the bridge company, and Senator Pettigrew, of South Dakota, is also interested in it. A. J. Tullock, President of the Missouri River Bridge & Iron Co., of Leavenworth, Kan., which will probably build the bridge, was in Yankton recently examining the plans with the officers.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

The Supreme Court of New York holds that the application of a portion of the proceeds of railroad bonds by the president and vice-president of a railroad company to the repayment of a loan made to them by a bank, and used by them in acquiring the stock of the railroad company, is a breach of a covenant in the mortgage securing the bonds that such proceeds will be used in the improvement of the railroad property.¹

In Kansas it is held that where a highway is established across a railroad company's right of way, the company is entitled to compensation for all necessary expenditures in constructing cattle guards and such other things as the statute requires it to construct on account of the highway.²

The general railroad act provides that one railroad company shall have the right to cross the track of another, and for the making of proper intersections; at such crossing, and for the appointment of commissioners to determine the rights between the parties at such crossing. The Supreme Court of New York decides that every railroad company acquiring a right-of-way under the act takes it subject to this reservation of the right of crossing.³

In Washington it is held that the statute, by expressly conferring on railroad companies the right to construct their lines across, along, or on any river, stream of water, or water course which their routes intersect or touch, excludes the right to construct lines across the tide lands belonging to the State.⁴

In the Federal Court it is ruled that persons who convey a right of way in Tennessee directly to a railroad company are entitled to a lien for the purchase price prior to that of the mortgage bonds of the company.⁵

In the Federal Court it is held that the appointment of receivers for a railroad system, and their taking possession of a leased line, does not of itself work an assignment or adoption of the lease so as to make the receivers liable for the stipulated rental. They have, as a general rule, a reasonable time to determine whether they will adopt the lease, or will merely pay to the lessor the net earnings of its road, subject always to the lessor's right to re-enter for condition broken. But where the lessor immediately demands of the receivers and of the court either an adoption of the lease or a surrender of the road, and against its protest a decision is delayed for several months, in order to determine which policy is expedient, then the receivers should equitably pay the full rental during the time of their possession. Especially is this true when the receivers were appointed at the request of the mortgagees, and upon their allegations that, in order to prevent ruinous sacrifices, the system must be held together, and operated as a unit.⁶

The Federal Court decrees that under Interstate Commerce Law the fact of the existence of ocean competition will not justify a railroad company's rates for carrying merchandise from New Orleans to San Francisco which

comes to New Orleans from domestic points, which rates are treble, and in some cases four times, the rates charged for carriage of like kinds of merchandise from New Orleans to San Francisco which reach New Orleans from foreign ports, although such lower rates constitute the only condition on which the carrier can obtain any part in such foreign traffic.⁷

In New York it is held that where a railroad company abandoned the use of a city street on acquiring a right to elevate its railroad, the land in the street reverted to the city, for street purposes, without a formal release from the railroad company.⁸

The Supreme Court of Nebraska rules that the statute making every railroad company liable for "damages inflicted upon the persons of passengers while being transported over its road," except where the injury arises from the criminal negligence of the persons injured, or "when the injury complained of shall be the violation of some express rule or regulation of said road actually brought to his or her notice," is constitutional.⁹

In New Jersey it is held that where an employee contracts in writing to obey certain rules and such other reasonable regulations as a Superintendent should afterwards make, the employee must receive notice of new regulations before he will be bound by them.¹⁰

The Supreme Court of Alabama rules that where a railroad company yields possession of its premises to a company which contracts to build a railroad thereon, and the latter company lets the contract to a third party, the first company is not liable for trespasses committed by the last contractor on adjacent lands, and it is immaterial that the work is to be done subject to the approval of the first company's engineer.¹¹

In New Jersey an employee agreed to account for the full weight of any cargo delivered to him, and authorized his employer to retain any money due the employee to an amount sufficient to cover any shortage in the cargo. It was also stipulated that the employee might be discharged for disobedience of an order of the Superintendent. The Court of Appeals holds that, if the employer held no money of the employee to retain on a claim for shortage, the Superintendent could not lawfully order him to pay an amount for shortage which he disputed, and on his refusal, discharge him.¹²

The Court of Appeals of Kentucky decides that the "net earnings," described in a mortgage, given by the L. to the C. railroad, of the net earnings of all business coming to it from or over the C. road, in consideration of a lease of the C. road, are ascertained by deducting from the gross receipts of such business its proportional share of the expenses of operating the entire road.¹³

In Indiana it is held that the statute requiring railroad companies to have written on a blackboard, 20 minutes before the schedule time for the arrival of a train at a depot, a statement whether the train is on time or not, and, "if late, how much," does not apply to a company operating a line, the regular time of passage from one terminus of which to the other is less than 20 minutes.¹⁴

In Iowa it is held that the statute providing that eight years' non-user of a railroad right-of-way shall work a reversion, does not forbid forfeiture for abandonment of use, in accordance with the conditions of a deed.¹⁵

In Mississippi it is held that where the right to change its route has been granted unconditionally to a railroad company, and it has abandoned the former location, it owes no duty to bridge or fill up a cut in such location.¹⁶

Injuries to Passengers, Employees and Strangers.

In Texas in an action against a railroad company for the death of a brakeman caused by the failure of defendant to provide a regular caboose car for deceased's train, there was evidence that the car used, while not a caboose car, was suitable for that purpose. The Supreme Court rules that the unsuitableness of such car for the purpose of a caboose could not be implied from the fact that its construction was different from a regular caboose.¹⁷

In Pennsylvania it is held that the rule that a railroad is responsible for injuries to its employees caused by defects in its cars, of which it was ignorant, as it is its duty to inspect its appliances, does not apply to companies or persons on whose sidings cars are delivered by a railroad company for the purpose of permitting them to load or unload them, so as to make them so liable for injuries to their employees.¹⁸

In Alabama it was the duty of an engineer in charge of several blowing engines in one room, if any one needed repair, to disconnect it from the steam supply, turn it over to a repairer, and, pending the repairs, prevent interference with it by others. The repairer secured the engine, either by inserting timbers in the fly wheel or by propping the piston rod with a timber. The engineer had disconnected the steam from an engine, and deceased, the repairer, had propped the piston rod. In some way the steam became reconnected, and the rod descended, crushing the prop and killing the repairer, who was in the air cylinder. The Supreme Court rules that since deceased's act in going under orders into the cylinder, where he was killed, was not the proximate cause of his death, but the supervening negligence of another, or unaccountable accident, there could be no recovery, under the statute, making the employer liable when the injury is caused by the act of omission of any servant in obedience to particular orders of a vice principal.¹⁹

In Kansas it is held that a bridge carpenter, employed by a railroad company who is injured while loading timbers from a bridge on a car for transportation to another point, is entitled to the benefit of the statute making railroad companies liable for injuries received by an employee in consequence of the negligence of its agents, or mismanagement of its engineers, or other employees.²⁰

In Illinois it is held that where deceased was killed on a dark, rainy night, while crossing the track at a street crossing on his way home, evidence that he was a sober, industrious man, possessed of all his faculties, and that he was struck by one train while another train, going in the opposite direction, obstructed his view, and probably distracted his attention, is prima facie proof that he was exercising due care.²¹

In Virginia the plaintiff received notice from the defendant company that certain goods for him were at its depot. While walking along the passage to the freight room, several boxes of iron, which had been carelessly piled, fell on him. The Supreme Court rules that the

⁷ Interstate Com. Com. v. T. & Pac. Ry. Co., 57 Fed. Rep. 948.

⁸ Tocci v. City of New York, 25 N. Y. S., 1089.

⁹ U. P. Ry. Co. v. Porter, 56 N. W. Rep., 808.

¹⁰ Val. R. Co. v. Snyder, 28 Atl. Rep., 376.

¹¹ A. M. Ry. Co. v. Martin, 14 South. Rep.

¹² Val. R. Co. v. Snyder, 28 Atl. Rep., 376.

¹³ Schmidt v. L. & C. L. Ry. Co., 25 S. W. Rep., 494.

¹⁴ State v. K. & I. Bridge Co., 35 N. E. Rep., 991.

¹⁵ McClain v. C. & N. W. Ry. Co., 57 N. W. Rep., 594.

¹⁶ A. & V. R. Co. v. Brandon (Miss.), 14 South. Rep., 438.

¹⁷ G. H. & S. A. Ry. Co. v. Davis, 23 S. W. Rep., 1019.

¹⁸ McMullen v. Carnegie, 27 Atl. Rep., 1043.

¹⁹ Dantzler v. Coal & Iron Co., 14 South. Rep., 10.

²⁰ C. K. & W. R. Co. v. Pontius, 34 Pac. Rep., 739.

²¹ Illinois Cent. R. Co. v. Nowicki, 35 N. E. Rep., 358.

² Belden v. Burke, 25 N. Y. S., 601.

³ Kan. R. Co. v. Johnson County, 34 Pac. Rep. 396.

⁴ B. & L. R. Co. v. N. Y. L. E. & W. R. Co., 25 N. Y. S., 155.

⁵ S. & M. Ry. Co. v. State, 34 Pac. Rep., 551.

⁶ Central Trust Co. v. Bridge, 57 Fed. Rep., 753.

⁷ Farmers' Loan & Trust Co. v. N. P. R., 58 Fed. Rep., 257.

plaintiff was a licensee, and defendant company was liable for failure to exercise ordinary care.²²

In New York it is held that it is not negligence, as a matter of law, to stand on the step along the side of an open street car, if the car is crowded.²³

In Massachusetts it is ruled that the jury are warranted in finding that an electric street railroad company was negligent in sounding the gong, and not slackening the speed of a car which was coming up behind an obviously frightened team.²⁴

The Supreme Court of Texas holds that a railroad is under no obligation to keep the platform about its depot in safe condition as against a boarding house keeper, who goes to the depot to meet an incoming train for the purpose of securing a boarder.²⁵

In Michigan it is ruled that one who had been in the employ of a railroad company for some time, passing and repassing a certain side track, could not recover for injuries received while attempting to uncouple moving cars on such track, resulting from a hole in the roadbed which he could have readily seen if he had looked at the track before going on it.²⁶

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Camden & Atlantic, 2½ per cent on the preferred stock, payable Sept. 15.

Canadian Pacific, semi-annual, 2 per cent on the preferred stock, payable Oct. 1.

Cheshtre, 50 cents a share, payable Sept. 11.

Chicago & Eastern Illinois, quarterly, 1½ per cent. on the preferred stock, payable Oct. 1.

Chicago, Milwaukee & St. Paul, \$3.50 a share on the preferred stock and \$2 a share on the common stock.

Cleveland, Cincinnati, Chicago & St. Louis, quarterly, 1½ per cent on preferred stock, payable Oct. 1.

Manhattan, quarterly, 1½ per cent, payable Oct. 1.

Mexican Northern, quarterly, 1 per cent, payable Oct. 20.

The previous dividend was at the same rate, a reduction from the 1½ per cent basis to the present rate having been made in June.

New York, New Haven & Hartford, quarterly, 2 per cent.

Sunbury & Lewiston, semi-annual, 4 per cent, payable Oct. 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Carolina Central, annual, Wilmington, N. C., Oct. 4.

Chesapeake & Ohio, annual, Richmond, Va., Oct. 23.

Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 22.

Denver & Rio Grande, annual, Denver, Oct. 3.

Lake Erie & Western, annual, Peoria, Ill., Oct. 3.

Old Colony, annual, United States Hotel, Boston, Sept. 25.

Pittsfield & North Adams, annual, Boston & Albany passenger station, Boston, Sept. 26.

St. Louis Southwestern, annual, St. Louis, Oct. 2.

Southern, Richmond, Va., Oct. 2, to vote on a proposal to execute a mortgage for \$120,000,000.

St. Paul & Duluth, annual, St. Paul, Oct. 11.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Railway Association* will hold its fall meeting at the Hotel Brunswick, New York, on Oct. 17.

The *American International Association of Railway Superintendents of Bridges and Buildings* will hold its annual meeting in Kansas City, Mo., beginning Oct. 16.

The *Western Railway Club* will hold its first fall meeting at the Y. M. C. A. Building, La Salle Street, Chicago, Oct. 18, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October, at 10 a. m. At the October meeting Mr. Morford's paper on "Terminal Yards" will be the opening subject for discussion.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station, on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m. The next meeting will be held on September 19.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its

rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.36 p. m. Address P. O. Box 333.

The *Foundrymen's Association* meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

The *Western Foundrymen's Association* meets in room 701, Western Union Building, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

Engineers' Club of Cincinnati.

The September meeting of the club was held in the rooms of the Literary Club, 24 West Fourth street, Cincinnati, on September 2, at 7.30 o'clock p. m. Mr. George T. Waite read a paper, "Notes on the Progress of Electric Traction."

Western Railway Club.

It has been arranged to hold the meetings of this Club in future in a hall in the building of the Young Men's Christian Association, and the banquet will be held at the Union League Club, instead of at the Great Northern Hotel as heretofore. Altogether, the reformation and rejuvenation of this club seems to be proceeding at a tremendous pace, and we have no doubt that its usefulness in the world will be greater than it has ever been before.

New England Railroad Club.

The members of the New England Railroad Club have varied the usual order of railroad club gatherings, by chartering a steamer recently, for a day's trip about Boston Harbor. The committee in charge of the arrangements for the excursion provided a band, a caterer with many good things for a short sea journey, and with pleasant weather an enjoyable day was spent. Some hours were spent at Provincetown, at the tip end of Cape Cod. About 200 members of the club went on the excursion, with their wives and sisters and other fellows' sisters.

The Traveling Engineers' Association.

The second annual meeting of this association was held in Denver, Sept. 11, 12 and 13, President C. B. Conger, of Grand Rapids, in the chair. The report of Secretary W. A. Thompson showed an increase of 21 active and 9 associate members. The membership now is 108 active and 26 associate.

The first discussion was on the report of the Committee on Air Brakes, which occupied most of the first day. Mr. George Royal, of Chicago, read a paper relating to the use of the injector.

The discussion upon the air-brake was resumed on the second day, and Mr. Frank D. Fenn, of the Crane Air-Brake Co., read a paper. He urged more systematic instruction in the machine shops on the air-brake and referred to the low standard of competency prevailing among the men at present in charge of most of the car equipment of the railroads of this country. They are a reproach to the boasted mechanical excellence of America. The use of pump governors was next discussed, followed by the committee report on coal saving. A committee was appointed to draft a digest of this report, to be submitted later in the session.

The third day was largely occupied in the consideration of the committee report upon a uniform examination of firemen for promotion and new men for employment, and color-blindness was discussed. President Conger thought that railroad companies should be more strict in satisfying themselves that their engineers are able to distinguish colors. In the afternoon the report upon double-headed engines was discussed.

On the fourth day the delayed report of J. M. Hutchinson, Chairman, upon the subject of testing coal was received by mail and was read before the convention. The special committee upon the relation a clean engine bears to the economical use of supplies recommended the adoption of the report as presented, with the addition that firemen be required to clean all that portion of the locomotive above the running board. This was adopted.

The election of officers resulted in the choice of W. E. Conger, Grand Rapids, Mich., President; R. D. Davis, Chicago, First Vice-President; George B. Brown, Dubuque, Second Vice-President; D. R. McBain, Jackson, Mich., Treasurer; W. O. Thompson, Elkhart, Ind., Secretary. The place selected for the next meeting is Pittsburgh.

The social features of the meeting were very enjoyable. Under the guide of gallant police officers a party visited the Chinese quarter one evening; the ladies were given a theatre party and drives about the city; a reception was tendered the delegates by the Ladies' Auxiliary of the T. L. A. (whatever that may be) in the Y. M. C. A. Hall, the shops of several of the railroads were formally visited, and following the close of the convention a three days' tour of the Denver & Rio Grande Railroad was made in a special train tendered by President Jeffery. During the convention the Union Pacific, Denver & Gulf gave the ladies of the party an excursion over the "Loop."

American Society of Civil Engineers.

A meeting of the Society was held on Wednesday evening, September 19th. A paper by B. W. De Courcy was presented on the subject of the Improvement of Gray's Harbor, Washington. The following is an abstract:

IMPROVEMENT OF GRAY'S HARBOR, WASHINGTON.

In order to make the harbors on the Pacific coast of the United States available for craft drawing over 15 ft. of water, they must be improved. Harbors of refuge are much needed, as the shore in the winter is a lee shore, and there is much loss of vessels and life.

Appropriations have been made and improvements carried out for harbor entrances south of the Columbia River, but none for any place north of that river. Two of the best natural entrances on the coast are north of San

Francisco, and also north of the Columbia River. These are Shoalwater Bay and Gray's Harbor. A survey of the latter made in 1891 shows a minimum depth of 16 ft., and the crest of the bar is of that depth for ¼ mile. The distance between the 18-ft. curves was ¼ mile. The bar was three miles outside of the gorge, formed by two points, which are ¼ mile apart at low water and 2 miles apart at high water. The depth on the bar is 48 ft. at low water, and 81 ft. maximum. The points mentioned were formed by the action of the Japanese current in the ocean, the storm winds and the fluvial discharge. The deepest water over the bar tends to vibrate for a short distance, but it is believed that by concentrating the water by properly constructed jetties a sufficient depth can be obtained for sea-going craft.

Congress several years ago made an appropriation of \$50,000 for the improvement of the rivers and harbor, which was expended in the removal of a shoal; 22 ins. in depth was gained over a limited area, but at the expense of the lower shoal near the long wharf.

The best authorities hold that streams should be improved from below, which proved to be true in this case, for the material removed from Cow Point Shoal was deposited on the shoal below. The improvement accomplished consists of a system of pile jetties, commencing at the south bank of the Chehalis and crossing the south channel, with some mattress work, and a jetty dam of the same construction across the middle channel. The writer believes that had the lower shoal been taken care of first, the result would have been more satisfactory. He also holds that where water is to be trained, curves should be used, and not angles introduced, as angles always cause an eddy. With a jetty with a curved trace in this case, with its concave face to the north, enough water could have been deflected to perform the scour needed. The deep channel would have followed the face of the jetty, and it would not have tended to form the bar below it.

These jetties are formed with piling, in two rows, with mattresses of brush sunk and filled in with fascines, weighted with stone. As there is no teredo in these waters, the writer believes that a system of piles and sheet piling would have answered the purpose.

Below the mouth of the Wiskah at Aberdeen, the Chehalis River has a width of 1,100 ft., with a mean hydraulic depth of 15.76 at low water. Just below Cow Point the river expands to 2,300 ft., with a mean hydraulic depth of 10.18 ft. at low water. The most natural course for improvement in direction is the south channel; this gives the shortest distance to the ocean, and the nearest channel to the shore, so as to require wharfs of moderate length to get deep water. The width of the river should be enlarged as it approaches the neutral line of deposit, but the enlargement should not be carried further. The river mouths ought to be trained so as to flow into the main channel parallel to the main stream. The Chehalis as now diverted by the improvement, is shoaling. While the training of the river through the harbor is commercially of great importance, the matter of a harbor of refuge is of still more consequence, as several large steam vessels have been wrecked north of the entrance to the harbor with a great loss of life.

North and south bays give a large area of anchorage, with a good shelter from all storm winds. Circumstances would indicate that half-tide jetties would supply all the concentration of force necessary to give a depth sufficient for vessels of the greatest draft. Not only is sand carried by the flood tide, but it is also carried by the prevailing northwest and southwest winds. This traveling of sand by wind can be provided for by the cultivation of the *arundo arundina*.

The ebb tide is the most efficient agent to deepen the channel over the bar, and the admission of the flood tide should be as unrestricted as possible; hence, converging jetties should be used. Dredging would be advantageous in some places. The Japan current causes erosion on the ocean side, and if the jetties be carried beyond the crest of the bar, there would be no extension of the bar seaward.

PERSONAL.

—Mr. E. L. Patterson, Western Passenger Agent of the Louisville & St. Louis Air Line, at Kansas City, has resigned.

—Mr. Joel W. Tyler, General Attorney for the Cleveland, Lorain & Wheeling Railroad, died at Cleveland, Aug. 14.

—Mr. W. S. Lincoln, Chief Engineer of the Wabas Railroad, has not resigned. We were misled last week into stating that he had.

—Mr. Cassius C. Smith, for four years assistant to the General Manager of the Rio Grande Western Railroad, has resigned his position and will make his home in future in the East.

—Mr. F. C. Webb formerly of the Chicago & Alton has been appointed Division Superintendent of the third, fourth and fifth districts of the Union Pacific, Denver & Gulf road, with headquarters at Denver, Col.

—Mr. S. C. Stickney, who has been Acting General Manager of the Chicago & Great Western since the resignation of John M. Egan some months ago, was given the full title of General Manager at the meeting of the Directors last week.

—F. J. Hawu, formerly Superintendent of Telegraph of the Wisconsin Central, has been transferred to St. Paul as Trainmaster. The office of Superintendent of Telegraph has been abolished, and the duties added to those of the General Superintendent.

—Mr. W. F. Brunner, now District Passenger Agent, with headquarters at Indianapolis, has been General Passenger Agent of the Pennsylvania lines west of Pittsburgh, with headquarters at St. Louis. He will succeed J. M. Chesbrough, who has resigned to accept the position of General Passenger and Ticket Agent of the Baltimore & Ohio Southwestern road.

—Mr. Ernest S. Cronise has severed his connection with Henry R. Worthington, New York, to engage in business on his own account. As the direct representative of leading houses he will do a commission business in iron, steel, machinery, railroad equipment and supplies, giving particular attention to the export trade. His address is now 37 Broad street, New York.

—Mr. J. N. King, Division Superintendent of the Lehigh Valley, in charge of the Seneca division, has resigned that office to take effect October 1. It is stated that he will then accept a position with the New York & New England Railroad as Assistant Superintendent at Hartford, Conn. Mr. T. H. Fennell, a former Superintendent on the Lehigh Valley Railroad, is now Superintendent of the western division of that railroad.

—Mr. C. F. Crocker, First Vice-President of the Southern Pacific Company, is arranging to make a journey around the world. He expects to start in about a month and will go first to Yokohama and will make as extensive a tour of Japan as the present troubles in the East will permit.

²² D. & W. R. Co. v. Brown, 18 S. E. Rep., 278.

²³ Bruno v. Brooklyn City R. Co., 25 N. Y. S., 507.

²⁴ Benjamin v. Holyoke St. Ry. Co., 35 N. E. Rep., 95.

²⁵ Post v. T. & P. Ry. Co., (Tex. Civ. App.) 23 S. W. Rep., 708.

²⁶ Ragon v. T., A. & N. M. Ry. Co., 56 N. W. Rep., 614.

Corea and China will also then be visited if those countries are then tranquil enough to permit journeying through them in comfort and safety. Mr. Crocker will also visit India and Egypt and the important capitals of Europe.

—Mr. Joseph Lennon Unsworth, Chief Superintendent of the Prince Edward Island Railroad, one of the Canadian Government lines, died at Charlottetown, on September 10, aged 54 years. Mr. Unsworth was born in England, but took service as a boy with the Grand Trunk, and was locomotive engineer on that road. While the Intercolonial road was building he went to that road and became its Master Mechanic. In 1881 he was transferred to the Prince Edward Island Road as Mechanical Superintendent, and in 1887 was appointed Superintendent also.

—Major Thomas Turtle, Corps of Engineers, U. S. Army, died at Washington, September 18. Major Turtle graduated from West Point in the class of 1867, and was fourth in a class which gave to the corps six engineers of unusual ability. These were E. H. Ruffner, J. C. Mailery, C. B. Sears, T. Turtle, Majors; and F. A. Mahan and C. F. Powell, Captains. Major Turtle has been for several years stationed in Washington on duty in the War Department. Prior to that detail he was secretary and disbursing officer of the Mississippi River commission in charge of river improvements in Southeastern Texas and in harbor work at New Orleans; and earlier was in charge of work on the defenses of various cities.

—Mr. E. M. Roberts, Superintendent of Motive Power of the South Carolina & Georgia Railroad, has resigned that position. Mr. Roberts has been with the company at the head of its Mechanical Department since 1891, when he entered its service as Master Mechanic, when it was the South Carolina Railroad. Before that he was with the East Tennessee, Virginia & Georgia Railroad as Master Mechanic. Mr. Roberts is a prominent member of the Master Car Builders' and Master Mechanics' Associations, and has been a member of many important committees on which he has done able and conscientious work.

—Hon. James H. Brown, General Manager and General Ticket and Freight Agent of the Annapolis, Washington & Baltimore Railroad, died at Annapolis, Md., on September 14. Mr. Brown had held this office for many years and had been with the company since 1863. In that year his father was elected President of the railroad, then known as the Annapolis & Elk Ridge Railroad and the younger Brown became a conductor, afterwards becoming General Ticket Agent, holding that office until his death. Mr. Brown had been prominent in the affairs of Annapolis in many ways. He was three times Mayor of the city, President of the Water Works Co., and held other honorable positions.

—Mr. C. E. Schaff, who has been Assistant to President Ingalls, of the Cleveland, Cincinnati, Chicago & St. Louis for the past year, has been appointed Assistant General Manager of that railroad. Before his appointment as assistant to the president, he was General Superintendent of the Peoria & Pekin Union Railroad. Mr. Schaff has come up through railroad service by steady promotion. He commenced his railroad life as a brakeman on the Panhandle and has served as fireman, conductor, yardmaster and trainmaster, so that he is well qualified by experience and pretty intimate acquaintance with the details of railroad operation for his present responsible position.

—Mr. J. W. Coleman, Assistant General Passenger Agent of the Illinois Central and Yazoo & Mississippi Valley roads, at New Orleans, has resigned those offices. He will be succeeded by Mr. F. B. Bowes, who has for a long time been General Northern Passenger Agent, with headquarters at Chicago. Mr. Coleman has been with the Illinois Central lines since 1880. In that year he became Assistant General Passenger Agent of the Chicago, St. Louis & New Orleans Railroad, which position he held until December, 1882, when he became Acting General Passenger Agent of the same road. In January, 1888, he was made Assistant General Passenger Agent of the Illinois Central, which position he has held to the present time, having also been made, under the same system, Assistant General Passenger Agent of the Yazoo & Mississippi Valley Railroad.

—Mr. Day K. Smith, President of the Duluth Transfer Railroad, died in Kansas City on September 14. He was removed there from Duluth last week in the hope of benefiting his health. Mr. Smith has been associated since 1892 with the Calumet Construction Co., which had undertaken to make important improvements at Duluth and Superior and as president of that company he has constructed about 10 miles of belt lines between those two cities. He was General Manager of this belt railroad, the Duluth Transfer, and also President of subsidiary companies. Before 1892 he was for some years Superintendent of the Kansas City Belt Railroad. His railroad life had been a long one and had given him a large experience in railroad work. He was for some time Division Superintendent on the St. Paul, Minneapolis & Manitoba and other roads.

—Mr. F. D. Adams, the veteran Master Car Builder of the Boston & Albany Railroad, recently celebrated the fiftieth anniversary of his wedding. Mr. Adams now resides at Newton near Boston, having removed to that town after living for a great many years at Allston, where the car shops are located. His house on the anniversary day was filled with children and grand-children and friends, who came with congratulations and good wishes. There were a great many gifts, but the one which gratified and pleased Mr. Adams as much, if not more, than any other, was a handsomely bound volume containing on one of its parchment leaves in embossed and ornamented letters the greetings and congratulations of the members of the Executive Committee of the Master Car Builders' Association, of which Mr. Adams is a past President. Everyone who knows Mr. Adams, hopes that the fine old man will continue his active work in railroading for many years.

—Mr. E. W. Jackson, Vice-President and General Manager of the Mexican Central Railroad, has resigned those offices to become President and Manager of the Inter-oceanic Railroad of Mexico. This is a railroad owned in England and now controlling about 340 miles of narrow gauge line from the City of Mexico to the port of Vera Cruz, with other lines. It was opened for operation in 1891. It runs through a heavy country, but has been very solidly built. Mr. Jackson's resignation from the Mexican Central is somewhat of a surprise. He has been General Manager of the railroad since 1885. Before that he had been with the Mexican & Vera Cruz Railroad, as General Manager for 10 years, and was Assistant Superintendent of Construction while it was being built. Mr. Jackson's successor as General Manager of the Mexican Central may be Mr. H. R. Nickerson, who recently resigned as General Eastern Superintendent of the Atchison to become Assistant Manager of the Mexican Central.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—The resignation of six directors of the company was announced on September 14th. The directors who retired were Messrs. Thomas Baring, John J. McCook, George R. Peck, E. B. Purcell, B. P. Cheney, and William Libbey. The vacancies caused by these resignations and that of J. W. Reinhart and by the deaths of George C. Magoun and Robert Harris were filled by the election of John A. McCall, President of the New York Life Insurance Co.; Thomas P. Fowler, President of the New York, Ontario & Western Railroad Co.; F. K. Sturgis of Work, Strong & Co.; William L. Bull of Edward Sweet & Co.; James A. Blair of Blair & Co.; E. J. Berwind of the Berwind & White Mining Co.; Gen. Samuel C. Lawrence of Boston, a Director of the Boston & Maine Railroad Co., and other New England corporations; B. P. Cheney, Jr., of Boston, and C. S. Geed, a lawyer, of Topeka, Kan. The other members of the board as now constituted are: C. K. Holiday, Topeka, the first President of the company; George A. Nickerson, Boston, one of the largest New England holders of Atchison stock. Alden Speare, Boston, has been a director of the Atchison Company for 26 years; L. Severy of Emporia, Kan., a Director of the Company for many years. Messrs. Cheney, Lawrence, Nickerson, Bull, Fowler, McCall, and Sturgis were appointed a proxy committee, to solicit proxies for the next election of Directors, which will take place at Topeka, Kan., on October 25th. The proxies received by the Committee will be voted in favor of the board now constituted, without material change in order that such board may fully protect the interests of the stockholders of the company.

Atlanta & West Point.—The annual meeting was held at Atlanta, on Sept. 10. George C. Smith was elected President and General Manager in the place of Captain E. L. Tyler, General Manager, and President Phinizy. The old Board of Directors was elected as follows: John S. Bigely, H. M. Comer, E. P. Chamberlin, T. L. Langston, W. B. Berry and H. C. Fisher.

Chicago Great Western.—At the annual meeting of the Directors last week the following officers were re-elected: President A. B. Stickney; Vice-Presidents, A. Kalman and C. W. Benson; General Manager, S. C. Stickney; Treasurer, W. D. Bond; Secretary, R. C. Wight; Auditor, M. C. Healion.

Cleveland, Cincinnati, Chicago & St. Louis.—Charles E. Schaff has been appointed Assistant General Manager, in charge of transportation, maintenance of way and equipment.

Flint & Pere Marquette.—S. T. Crapo has been appointed General Manager, with office at Saginaw, Mich., and has entered upon the duties of that office.

Fort Worth & Rio Grande.—Chief Dispatcher Huddleston has been promoted to the office of Superintendent of Transportation, with headquarters at Fort Worth, Tex.

Great Northern.—C. W. Hallock, Traveling Freight Agent, has been appointed General Agent at Des Moines, Ia. W. J. Wagner has been appointed to succeed Mr. Hallock as Traveling Freight Agent and will have headquarters at St. Paul.

Kanawha Dispatch.—H. P. Hathaway has been appointed Traveling Freight Agent of this line with headquarters at Cincinnati, O.

Mason City & For. Dodge.—The general offices of this company will be removed from Mason City to Fort Dodge, Ia., on Oct. 1.

Portland & Rumford Falls.—The following Directors were chosen at a meeting at Portland, Me., on Sept. 11: Hugh J. Chisholm, Daniel F. Emery, Jr., George C. Wing, George D. Bisbee, Waldo Pettengill, George W. Russell, Galen C. Moses, R. C. Bradford; President, Hugh J. Chisholm; Superintendent, L. L. Lincoln; Treasurer, R. C. Bradford.

Rumford Falls & Rangeley Lake.—The company has been organized in Maine with these officers: Directors, Galen C. Moses, F. H. Twitchell, Bath; W. W. Brown, Hugh J. Chisholm, Portland; Edward Plummer, Lisbon; Charles A. Brown, Portland; E. B. Denison, Portland; Waldo Pettengill, Rumford, and ex-Mayor W. H. Newell, of Lewiston. The Directors have elected the following officers: President, Galen C. Moses; Treasurer, Fritz H. Twitchell; clerk, W. H. Newell.

Southern.—A. L. Buck has been appointed Roadmaster of the sixth division, vice J. A. Davenport, transferred to the Eastern system. His headquarters will be at Birmingham, Ala.

St. Johnsbury & Lake Champlain.—The annual meeting of the St. Johnsbury & Lake Champlain Railroad, held at St. Johnsbury, Vt., on September 13, elected these directors: C. S. Page, Hyde Park; S. C. Shurtleff, Montpelier; Franklin Fairbanks, St. Johnsbury; H. E. Folsom, Lyndonville; George W. Hendee, Morrisville; S. C. Lawrence, Medford, Mass.; H. R. Reed and W. T. Hart, Boston; C. E. A. Bartlett, Chelmsford, Mass. The directors organized by electing C. E. A. Bartlett, President, and George W. Cree, Treasurer, to succeed F. W. Morse.

St. Louis, Kansas City & Colorado.—E. O. Faulkner has been appointed Manager, Auditor and Treasurer for the Receiver, with headquarters at St. Louis. Adiel Sherwood is Receiver of the railroad.

Toledo, Peoria & Western.—This railroad practically passed into the control of the Pennsylvania and the Chicago, Burlington & Quincy on Sept. 10, when Directors representing the interests of those roads were elected. It is understood that the formal change of management will be made shortly. The Board of Directors was reduced from nine members to five. E. F. Leonard, of Springfield, Ill., was re-elected, as was also Franklin H. Heald, Vice-President of the American Trust & Saving Bank, of Chicago, who is an official of the Pennsylvania road. The three new Directors elected were J. E. Davidson, of Pittsburgh, Third Vice-President of the Pennsylvania Company; W. H. Baldwin, President of the St. Louis, Keokuk & Northwestern, a Burlington road, and O. F. Ilington, and O. F. Price, of Galesburg, Ill., and attorney for the Burlington. Of the new Board of Directors two are Pennsylvania representatives and two Burlington officials.

Toledo, St. Louis & Kansas City.—At the annual meeting of the railroad held in Toledo, O., Sept. 13, the following Directors were elected: S. R. Callaway, of Toledo; Joseph S. Stout, S. H. Kneeland, of New York; and Samuel K. Wilson, of Trenton, N. J., for three years; James L. Laidlaw, of New York, for two years, and J. O. Osgood, of New York, for one year. Messrs. Wilson and Laidlaw are the new members of the directory.

Vandalia Line.—George E. Rockwell, City Passenger Agent at Indianapolis, has been promoted to be District Passenger Agent at Indianapolis in place of W. F. Brunner, who has been transferred to St. Louis as Assistant General Passenger Agent.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Beaver & Ellwood.—The contract has just been let for the extension of the company's line from South Ellwood City to North Sewickley, Pa. J. B. Shields & Co., of the Girard furnaces at Girard, O., are largely interested in the new project. Allison Bros., of New York, will build the line. Paul Didier, Chief Engineer of the Pittsburgh & Western, with a party of engineers, is making the final preliminary surveys and work will be commenced next week on actual construction of the line. The territory to be developed by this road includes extensive coal lands and limestone quarries.

Benwood & Southern.—The contract for the railroad which is to run from Benwood, W. Va., near Wheeling, to Moundsville, W. Va., a distance of 12 miles, was let last week to Wareham & Hughes, for Beaver Falls, Pa., at \$200,000. The right-of-way follows the public road throughout the distance, and at "The Narrows," will be built on solid masonry. A powerhouse will be located at Glendale, the half-way point.

Birmingham, Sheffield & Tennessee River.—The party of engineers who began the preliminary surveys three weeks ago for the extension of this road into Birmingham, Ala., have completed their work. The surveys were in charge of John Foster. The survey began at Parrish Mines, 12 miles south of Jasper, Ala., its present southern terminus, and was run to Dolomite, two miles from Bessemer, at which latter point connections can be made to Birmingham with some line now entering the city. The road is now operated by E. A. Hopkins, of Philadelphia, as Receiver. Of course he has no authority to undertake new construction work in the way of extensions, but some of the large bondholders, who have been in Alabama recently, are reported to have stated their approval of the project, and that a majority of the bondholders would probably agree to the early construction of the extension.

Buffalo, Rochester & Pittsburg.—A short extension has recently been undertaken from Curwensville, Pa., to reach stone quarries in the mountains near that town. The quarries are controlled by a Pennsylvania firm and a good quality of sandstone is found there. The quarries have not been worked because there was no rail connection, but they will now be developed.

Burlington & Missouri River.—The contractors returning from the construction headquarters on the extension of this line which is being built to Billings, Mont., report that the grading is now practically completed and that large numbers of men who have been employed on the work are being discharged daily. The extension joins the Northern Pacific line about 12 miles from Billings, and the rails are within 30 miles of the Yellowstone River, reached at that point. The rails are being laid by a track-laying machine, about a mile and a half of track being completed daily on the average. Construction trains will be running into the town of Billings before Oct. 1. The contractors experienced much difficulty in getting all the laborers needed for the work. Most of the forces were composed of men from the larger Western cities—Chicago, Kansas City and St. Louis—who were secured through labor agencies. For the greater part of the time while the construction work was at its height, over 1,000 men and nearly 700 teams were employed on the work, though sometimes the number of men approached 2,000.

Chicago, Superior & Northern Pacific.—This company has been incorporated in Wisconsin for the purpose of building a line from Superior to a point on the State line between Wisconsin and Illinois. It is proposed to use the 50 miles of the abandoned grade of the Chicago, Superior & Ait Line, also to construct a branch from Waterloo to Columbus. The proposed starting point is Geneva Junction and the line is to extend in a northwesterly direction through the towns of Geneva, Elkhorn, White Water, Jefferson, Waterloo, Portage City, Friendship, Millsville and Hayward to Superior. Robert E. White, a New York attorney, is soliciting aid for the enterprise from the counties and towns through which it is proposed to build.

Cincinnati, Lebanon & Northern.—The company is now running its standard gauge trains throughout the entire length of the railroad from Cincinnati to its northern terminus at Lebanon, O. This is a distance of 30 miles, but for the present narrow gauge trains will also be run from Cincinnati to the town of Blue Ash, about 12 miles out from Cincinnati. This is a commutation station for Cincinnati and narrow gauge equipment will be continued in use for that traffic so long as it pays to keep the equipment in repair. The company now has four standard gauge locomotives and has 15 passenger cars mounted on standard gauge trucks.

Clearfield, Conemaugh & Western.—A meeting of the Directors was held at the office of President S. J. M. McConnell, Harrisburg, Sept. 20. Chief Engineer Samuel Brugger presented his final report of the surveys for the new line, which is to run from Belsens Mills, Clearfield County, to Johnstown, Cambria County. A contract will shortly be let for the construction of at least half of the road.

Cleveland, Lorain & Wheeling.—The Cleveland extension of this company will be completed about the middle of this month. The line is over 25 miles in length, and leaves the present road of the company at Elyria, extending from that point in a nearly direct line into the city of Cleveland. The cost of the right-of-way has been a very heavy item, but otherwise the construction has not been unusually expensive. The town of Lorain, the western terminus of the line, is already feeling the impetus of the locations of the Johnson Steel Works there, and of course when the works are in operation the company will have an important increase of traffic.

Duluth & Iron Range.—The branch to Eveleth, on the Mesaba Iron range, Minnesota, has been completed.

Dry Fork.—It is expected that this railroad can be opened for traffic from Hendricks, to Wharton, W. Va., on October 1, a distance of 35 miles. The grading is completed, and the rails are down except for five miles. The road is now operated from Hendricks, the junction of the West Virginia Central & Pittsburg, to two miles beyond Thorne Grove. The road at present contracted for runs from Hendricks to the confluence of Dry Fork of Cheat River, and Gandy's Creek, a distance of 32 miles, and thence it follows Gandy's Creek 15 miles to the Allegheny divide. Two large saw mills have already been completed on the lower part of the line, and are waiting for the completion of the road to commence operations. The Trowbridge Company has prepared plans for the building of a six-mile extension from Gandy's Creek to a large tract of timber it owns.

Eastern Nebraska & Gulf.—The work of securing aid for this proposed road in Nebraska is being pushed all along the line. At Homer the people will vote on Oct. 3 on the proposition to issue bonds in the sum of

\$15,000 in aid of the road. Other elections will soon be called at other points on the proposed route. W. C. McNamara, General Manager of the road, says the indications are that aid will be voted the road at every point where it is asked. He is confident the plans of the company will be far enough advanced by spring so that it can go ahead and build a part of the line from Lincoln to the southwest.

Elkton, Middleton & Massey's.—A formal beginning of work on this road was made at Elkton, Md., last week, on the last day allowed by the contract made with the General Assembly last Spring in order to secure the \$58,000 appropriation. The road is to be built through Cecil County, Md., as a branch of the Pennsylvania.

El Paso Northern.—The charter of this company has been filed in Texas during the past week. The road is to extend from the city of El Paso along the right of way granted by El Paso to the Kansas City, El Paso & Mexican Railroad in 1888, thence northeasterly through the county of El Paso about 20 miles more or less, to a point on the division line between New Mexico and Texas. The Directors are: C. E. Satterlee, G. J. Gould, W. H. Abrams, C. R. Morehead, L. S. Thorne and E. L. Sargent. This indicates a revival of the old project for a line from El Paso to Albuquerque. When the Kansas City, El Paso & Mexican, which started to build this line in 1888, became bankrupt, its property was purchased by Jay Gould, as President of the Texas & Pacific. Since then the officers of that company have shown little interest in the project.

Fort Bragg Lumber Co.—G. W. Hunt, a well-known railroad contractor of Washington, has taken the contract to build the railroad projected by this company through Northern California and into the State of Oregon. The lumber company owns a great deal of lumber land in Northern California, but the railroad which it proposes to build is to reach coal mines in the northern part of Mendocino County. The mines are about 50 miles from the town of Fort Bragg, the headquarters of the lumber company.

Gulf, Colorado & Santa Fe.—William Schneider and J. Hanson, contractors in charge of the construction of the 15-mile extension north of the Neches River in Texas, report the grading completed for several miles. Track laying will be commenced in a few days.

Gulf & Interstate.—The officers of this railroad, which has been developed out of the Populist railroad project, give out the information that they have made important contracts looking toward the construction of the railroad through Texas. An agreement has been made, they state, with the King-Charles Construction Co., of Pittsburgh, a concern of which nothing was heard until it came to be talked about in connection with this railroad, by which that company undertakes to build 150 miles of the railroad through Texas, or to lay the track on that section of the railroad. We are not sure what the contract includes; reports differ. The King-Charles Construction Co., is said to be interested in some kind of track superstructure. The officers of the railroad company state that the first work will be the completion of the line through Bolivar Peninsula to the town of Beaumont, in eastern Texas. This line is already graded for something over 40 miles from Bolivar Point, opposite Galveston. In accordance with the laws of Texas a separate company has been organized to carry on the work in that state, of which E. De Normandie of Galveston, is President. The headquarters of the project are however at Topeka, Kans., where F. J. Close and others of the active projectors are located.

Hendersonville & Brevard.—This company will build at once 21 miles of standard gage railroad from Hendersonville, N. C., on the line of the Asheville & Spartanburg R. R., to Brevard, N. C. Henry M. Warren & Co., No. 115 Broadway, New York, will have the placing of all contracts, including grading, rails, ties, rolling stock, etc.

Indiana, Illinois & Iowa.—The work of laying rails on the extension from Knox to South Bend, Ind., was commenced last week. No trains will be run over the extension until it is completely ballasted. It is not expected that the extension will be open for traffic before December. It is about 20 miles long.

Jackson.—Work was commenced last week on the Jackson Railroad, from Jackson to McManus, La., on the Yazoo & Mississippi Valley Railroad. The company is a local one, with F. Herr, of New Orleans, President. The road will be completed about Feb. 1, 1895.

Lehigh Valley.—Work has begun on an extension of the Honeoye Falls branch into the village of that name, near Rochester, N. Y. The distance is about three-fourths of a mile, and the line will be a double track. The original intention was to build this branch from Rochester Junction to Hemlock Lake, but the work was stopped before much progress had been made. The project of carrying it in the other direction to the lake will probably be taken up another year.

Little Rock, Hot Springs & Memphis.—Some of the storekeepers at Little Rock and Benton, Ark., have secured attachments against this railroad for an indebtedness of over \$7,000 for supplies furnished. The local managers of the project, however, state that this attachment will not be allowed to stand long and that they are hopeful that the construction work will be resumed with every prospect of the work being continued until the line is built into Hot Springs. Colonel Uriah Lott, the projector of the road, who has the contract to build it and is the company's financial agent, has been in New York in an effort to raise funds to carry on the work. He is said to be now on his way to Arkansas, having been able to make some arrangement with a firm in New York to advance the funds to enable him to push the construction. The section on which the work has been started is between Hot Springs and the town of Benton, Ark., which is half way between the former city and Little Rock, which is to be the ultimate terminus of the railroad.

Nevada Southern.—Early last year the officers of this company operating a road in San Bernardino County, Cal., had arranged to build a further extension of 40 miles to the mines at Good Springs, but the work had to be suspended on account of the commercial depression. During the year the company has been operating the 30 miles of railroad already built from Blake Station, Nev., on the Atlantic & Pacific Railroad north to the mines at Vanderbilt and Marvel, Cal. Now it is said that an effort is to be again made to go ahead with the proposed extension beyond that town. S. T. Godbe, a large stockholder, and owner of mines in Utah, has just arrived in California after a long visit to New York and he states that President Blake and other officers of the company, accompanied by a number of eastern men interested in the railroad and the mines which it will develop, are arranging to visit the properties during the Fall. It is expected that an agreement will be effected with the Utah-Nevada Co., an organization recently formed with a large

capital to operate mines in Utah, including the Pioche, Keystone and Gladiator groups. This company is to complete and put in operation the railroad from Milford to Pioche, Nev., which was nearly all graded by the Union Pacific some years ago during the presidency of C. F. Adams. In addition to completing this line, which will give the Pioche mines an outlet to Salt Lake City, these capitalists also propose to extend the railroad beyond Pioche to connect with the extension of the Nevada Southern Railroad, and in this way effect a connection with the Atlantic & Pacific Railroad. J. Clafin, of New York, and J. R. Delemar, a western mine owner, will be among those to accompany the officers.

New Roads.—S. S. Chisholm, of Chicago, President, and Charles B. Houghton, of Milwaukee, Vice-President of the syndicate of Northern capitalists that purchased the Mountain Lake property in Giles county, Ga., and in connection with it 26,000 acres of valuable timber land, bearing white pine, white oak and yellow poplar, are now in Virginia to direct active preparations for the development of this property. Their headquarters will be at Roanoke, Va. The contract for the construction of a railroad extending from Curve Station, on the New River Division of the Norfolk & Western, into their land, a distance of 11 miles, will be awarded at once. Three saw mills will also be built.

Heald & Holiday of Ironton, Ohio, have closed a contract with the Frazier Highland Construction and Equipment Co., of Chicago, for the construction of a line between Manchester and Winchester, Ohio, a distance of 25 miles, and to equip the same.

Hon. James Gilfillan, and E. C. Machen, both of New York, are members of a syndicate which has in contemplation the building of a new line of railroad from Harrisonburg, Va., by way of Elk and Williams Rivers, to Charleston, W. Va. These gentlemen made a trip over the proposed line last week. It is proposed to utilize the grades and surveys made several years ago for a narrow gage line from Harrisonburg to the West Virginia line, and to follow the same route into Pocahontas County, W. Va., by way of the town of Frost, thence to the Elk River, and to the State Capital.

Northern Pacific.—Chief Engineer McHenry, who has been inspecting the Pacific Coast lines for some weeks, has assured the citizens of Aberdeen, Wash., that the branch to that town would be built if the town assisted. The distance to be built over is 2½ miles, from near South Aberdeen on the Gray's Harbor Line. Two years ago the company completed the grade about 1½ miles toward the town, but no track was laid. The company claims to have expended \$80,000 on this work. The work along the bluff was expensive, on account of the blasting that had to be done. This grade is in bad condition in many places and the city agrees to repair it and continue it to the east bank of the Wishkah River, and also to furnish ties and rails and assist in laying the track.

Ottawa & Gatineau Valley.—This railroad will be extended this year from Pickanock to Le Desert, Que., a distance of 27 miles. About 100 men have been started on the work. Pickanock has been the terminus of the road since last winter. It is 56 miles north of Hull, the southern terminus of the road, a small town opposite Ottawa. This road is one of the projects of H. J. Beemer, of Montreal. It is operated from Ottawa by J. F. Prince, General Superintendent.

Richmond, Nicholasville, Irvine & Beattyville.—Judge Barr, of the United States Court at Louisville, has decided that the guarantee by the Louisville, New Albany & Chicago, of the Richmond, Irvine & Beattyville bonds is illegal, and indorsement has been ordered to be cancelled. In this decision the Louisville, New Albany & Chicago has won an important suit against the Ohio Valley Improvement Co., to test the legality of its indorsement of the bonds of this road, made under former management.

Roaring Creek & Charleston Railroad.—The work on this line is making good progress now. Trains are running as far as Womelsdorf from the connection with the West Virginia Central & Pittsburgh. The road bed is completed for eight miles below Womelsdorf, and as soon as work on the trestles and bridges now under way progresses a little further, track laying can begin again. The work in the wilderness is being pushed by Lang & King, who have 200 men at work on the trestle. Scott & Elbon are at work on the Croftlede trestles which is 32 ft. high and 358 ft. long. The Minnesota trestle, will be the largest on the road, and is 67 ft. high throughout its length, and 250 ft. long. A steel bridge is being built at Monroe. At Womelsdorf three coal mines are in operation, all having been opened since the opening of the road to that point less than three months ago.

Ronceverte & Lewisburg.—Messrs. E. R. Hicks and C. T. Hamilton, members of the electrical engineering firm of Hicks, Hamilton & Co., of New York, have been making estimates for a freight and passenger railroad from Lewisburg to Ronceverte, W. Va., and they find the line practicable, and the amount of traffic offered at present ample to make the line profitable. If that report is based on a careful investigation it ought not to be necessary to propose the plan now talked of for building the road—to have each town make a subscription equal to half the cost of the roads, and own it jointly as a municipal investment.

Rumford Falls & Rangeley Lake.—The surveys for this line from Rumford Falls, Me., have been completed by R. B. Stratton, of Rumford Falls, Engineer of the road. The company is now ready to let contracts for 18 miles of the railroad from Rumford Falls to the town of Byron. The projectors recently applied to the Maine Railroad Commissioners to approve the building of 10 miles of the road, but the total length of the projected line is 28 miles. This will bring the terminus to Bemis stream on Lake Mooseluckmeguntic. Galen C. Moses, of Bath, is President of the company. Bids for the work about to be put under contract are being received by Waldo Pettigill, of the Directorate, of Rumford Falls. The names of other Directors are given in another column.

San Pete Valley.—President Bruback states that the grade on the extension now building is completed from Manti to Morrison, Utah. The ties are on the ground and the rails have been ordered and will be laid by Oct. 15. This 8 mile extension, when completed, will have cost about \$100,000.

Southern Pacific.—General Manager Kruttschnitt announces the opening for traffic of the Midland Branch of the Louisiana Western Railroad, referred to last week. There are three stations on the line besides Midland, which is at the junction with the Southern Pacific's main line to New Orleans and Eunice, La., the northern terminus of the railroad. The distance between these two stations is 24 miles. Midland is about 114 miles west of New Orleans.

Summit Mineral.—The railroad company was chartered in Montana by Arthur G. Lombard, Cornelius

Hedges, William Dyer, John D. Wilson and Ogden A. Southmayd, to build a railroad from Rimini to Deer Lodge. The railroad will extend through the Rimini mining district in southwestern Montana. The preliminary surveys for the line were made during the Summer by A. G. Lombard.

Tennessee Central.—The grading on this railroad, which has been going on steadily for some time in an effort to reach the town of Crossville, Tenn., has now been completed to within five miles of that town. The right-of-way has been cleared almost to within the town limits, but the grading is being delayed by rock work and trestle construction near the Obed River. The grading is being done by convicts, about 250 being used on the grading. Colonel J. Baxter, of Nashville, is the chief owner of the railroad. Its eastern terminus is at Lebanon, Tenn., and it extends through Cumberland County to Crossville. Recently the company's charter has been amended, providing for an extension to the towns of Harriman, Kingston and to Knoxville.

Texas Western.—General Manager E. A. Campbell announces that trains are again running the entire length of the railroad from Houston into the town of Sealey, Tex., beyond the Brazos River. This property is owned by Elijah Smith, of Boston, and has been in bad repair for a long time. During the early part of the year the court ordered traffic suspended until the road was repaired. A short time ago Mr. Campbell secured a lease of the railroad and has made important improvements in the road-bed. The bridge across the Brazos River had been burned while traffic was suspended and trains could not be run into the western terminus until that structure had been rebuilt.

Trinity, Cameron & Western.—Major R. Lisle, of Cameron, the President and most energetic of the projectors of this company, has been very active recently in addressing town meetings in his efforts to secure right-of-way and local subsidies for this railroad in Texas. He has secured from the people of Madison County the right-of-way through that county for 37 miles and a bonus of \$15,000 from the town of Madisonville. He promises to begin the construction work at Georgetown, which is to be the western terminus of the railroad, before the winter months. Some work may also be done at Trinity and other towns along the line.

Unadilla Valley.—Frederick T. Culver, of New York, General Manager, announces the opening of this road for freight and passenger service between Bridgewater and West Edmeston, N. Y. Charles N. Chevalier, Bridge-water, N. Y., is Superintendent. The rails are now being laid south of West Edmeston, and the road will soon be opened to additional points.

Virginia & Carolina.—W. G. Dacey, of New York, who is at the head of the syndicate which made an agreement last spring with the City Council of Petersburg, Va., to purchase that city's interest in this uncompleted railroad, has arranged, according to his local agent at Petersburg, to visit that city this month and formally complete the purchase of the property. The agreement with the city is that the present graded roadbed from Petersburg out to the Virginia State line shall be transferred to Mr. Dacey and those associated with him. They will undertake to organize a new company to complete the railroad, the city accepting the securities of the new company for the railroad bonds which it now holds and through which it has control of the unfinished road-bed.

Waddington, Canton & Southern.—The Railroad Commissioners of New York, as noted last week, have issued to this company a certificate, that public convenience and necessity require the construction of the railroad as proposed, the railroad to be standard gage, about 27 miles in length, and to extend from a point on Dry Island, an island in the St. Lawrence River, in the town of Waddington, to near High Falls, so called, on the Grasse River in the town of Canton, near the post-office of Pyrites. The road is wholly within St. Lawrence County. The Directors for the first year are: James Spears, John C. Keeler, S. D. Bridge, R. T. Wells and Henry E. Seaver, Canton, N. Y.; William W. Proctor, J. G. Tait, Waddington, N. Y.; Joseph G. Taylor, Buffalo, N. Y., and Frederick J. Merriman, Madrid, N. Y. James Spears is President and John G. Tait Chief Engineer.

Waterville.—W. T. Haines has secured from the city government of Waterville, Me., the promise that a town election will be called for Sept. 26 to act upon a proposition he makes in regard to the construction of the proposed railroad from that town to connect with the Wiscasset & Quebec road. He asks that the town subscribe \$26,000 of the capital stock to be issued to construct the railroad, which will be 14 miles long. A strong opposition to his plans has already been evidenced and it is considered doubtful if he will be able to secure a favorable vote, as this city is now heavily bonded.

GENERAL RAILROAD NEWS.

Baltimore & Drum Point.—A new company, calling itself the Baltimore & Southern, has been formed to complete the Baltimore & Drum Point Railroad. The Directors of the new corporation are James W. Owens, Thompson M. King, of Anne Arundel County; Thomas B. Turner, of Calvert County; Amos D. Neeld, of Washington, D. C., and Luther H. Gadd, of Caroline County. The new company purposes to complete the Drum Point road and extend the line across the Patuxent River to St. Catharine's, a point on the Potomac River, in St. Mary's County.

Brigantine Beach.—Judge Howard Carrow, of Camden, N. J., has been appointed temporary Receiver for the railroad by Chancellor McGill, on motion of counsel for Samuel R. Shipley, of Philadelphia, a stockholder and creditor. Argument for a permanent Receiver will be heard on Sept. 25. The railroad company was organized in 1889, to construct a road from Pomona, Atlantic County, terminating on Brigantine Beach. In November, 1889, the company issued \$350,000 of bonds, executing a mortgage to the Holland Trust Co., of New York. It is alleged in the complaint that no interest on these bonds has been paid.

Cincinnati Southern.—The committee of which John Greenough is chairman, and which represents the minority American interest in the Cincinnati Extension 5 per cent. bonds of the East Tennessee, Virginia & Georgia, has agreed to a proposition made by the Richmond Terminal Reorganization Committee for the purchase of all the minority bonds, paying for them in the securities of the new Southern Railway Company. The bondholders will receive 30 per cent. of their holdings in the bonds of that company and 7½ per cent. in its preferred stock. The foreclosure suit by this committee for enforcing the sale of the collateral deposited with the Central Trust Co., will be

pushed to a conclusion, the courts having decided that the minority bondholders have a right to institute this proceeding. This committee expects to purchase the railroad at the foreclosure sale and it will then be transferred to the Southern Railway Co., and operated thereafter as one of its lines. Opposition to the sale has been made by the Cincinnati, Hamilton & Dayton, as controlling the majority of the bonds, but the interest is in default, and the courts held that the minority bondholders were exercising their right in asking for a sale of the securities. That company will be a bidder against the committee at the sale. The purchase, some months ago by the Cincinnati, Hamilton & Dayton of a majority of the so-called Cincinnati Extension 5 per cent. bonds which were issued by the East Tennessee, Virginia & Georgia to give it control of the Cincinnati Southern property, immediately developed a contest among the bondholders. The Cincinnati, Hamilton & Dayton purchased \$3,100,000 of these bonds through Baron Erlanger. He had secured control of this amount when they were issued by the East Tennessee, Virginia & Georgia, in payment of his interest in the properties for which they were issued. When the announcement was made that Baron Erlanger had sold the bonds it was claimed by the American Bondholders' Committee that in doing so an agreement with that committee which was intended to prevent any sale of the bonds until notification had been given to all interests, was disregarded. It must be remembered that the lease of the Cincinnati Southern is held by the Cincinnati, New Orleans & Texas & Pacific Road, but 51 per cent. of the stock of that company is controlled by an English corporation, the Alabama Great Southern Railway Co. This controlling stock, with other securities, is deposited as collateral to secure the Cincinnati Extension 5 per cent. bonds. The American interests have been represented on the Board of Directors of the English Company by Messrs. Samuel Thomas, Calvin Brice and John Greenough. At a recent meeting of the stockholders in London, these directors failed of re-election. This action, however, was unimportant in its relation to the control of the property. The bonds being in default the American Bondholders' Committee secured an order from the United States Court providing for the sale at foreclosure of the securities carrying control, and the future ownership of the property will be decided at that sale.

Columbus, Hocking Valley & Toledo.—The suit of the Central Trust Co., of New York, against Judge Stevenson Burke and others for \$8,000,000, the proceeds of bonds of the company, sold by Burke and colleagues in 1882, when they were in control of the road, and alleged to have been converted to their own use, was argued in Common Pleas Court at Columbus, O., Sept. 17, on the defendants' demurrer. Suit was brought in this matter in 1887 by John W. Shaw, then President of the company, for the stockholders. The Common Pleas Court at Columbus decided against Burke. An appeal was taken, and then the matter was referred by agreement to arbitrators, who decided in Burke's favor. Now suit is brought on behalf of the bondholders as a new case. Burke and his colleagues demur to the action, on the ground that the dispute has once been adjudicated.

Evansville & Richmond.—Messrs. Harvey Fisk & Sons have notified the bondholders of the Evansville & Richmond Railroad Co. that they have abandoned the arrangement looking to a consolidation of the Bedford Quarries Co., the Bedford Belt Railway Co., and the Evansville & Richmond Railroad Co., only about two-thirds of the bondholders having assented.

Middle Georgia & Atlantic.—This road was sold at auction in Savannah on Sept. 13 under foreclosure, by the Oglethorpe Savings & Trust Co., trustees under the mortgage executed to secure an indebtedness of about \$192,500 loaned by a syndicate composed mostly of stockholders of the property. The road was bought for a committee of the syndicate by Herman Meyers, whose bid was \$195,000. The road is 65 miles long and extends from Milledgeville northwest to Covington, Ga. The total issue of bonds is \$792,000, and these with the stock of the road, which was owned by the Seaboard Co., and all other assets, were sold under the mortgage.

New York & New England.—The Reorganization Committee has decided to begin foreclosure proceedings in Massachusetts at once. Little work can be done now to further the reorganization until after foreclosure. Even then the reorganization cannot be perfected until needed legislation is obtained both in Connecticut and Rhode Island.

Norfolk & Western.—The suit of Mills & Fairfax against the railroad company for \$40,000 balance alleged to be due on contract for cutting Flat Top tunnel, on the West Virginia line, was begun in the United States Circuit Court at Roanoke, Va., this week.

Oregon Short Line & Utah Northern.—The various United States Circuit judges in Wyoming, Idaho, Utah and the other states through which this railroad extends, have issued decrees appointing the present receivers of the Union Pacific receivers of this property also. These orders were made in several foreclosure suits against the railroad in Wyoming, bought by John N. Dillon, in trustee for the mortgage of \$14,931,000; in Utah by Joseph Richardson for the foreclosure of the mortgage of \$4,495,000, and by J. M. Hannah as trustee for the foreclosure of the mortgage of \$3,900,000. These decrees were opposed by the American Loan & Trust Company's attorneys, who endeavored to secure a postponement of the hearings. The western interests in the property also endeavored to secure the appointment of local receivers, who would operate the property independent of the Union Pacific Lines.

Philadelphia & Seashore.—Vice Chancellor Pitney, of Camden, N. J., has made a decision in the suit involving the legality of the \$762,000 worth of bonds issued by this company, a New Jersey Corporation organized a few years ago to build a road to Atlantic City. The decision holds that the entire issue of bonds was illegal, but that those held by innocent third parties and for which an adequate equivalent had been given to the company are entitled to share in the funds now held by the Receiver, P. T. Baker, which amount to about \$185,000. Among these bonds are \$125,000 held by the Bethlehem Iron Co., for rails furnished. The court declares that the contract made by the company with E. R. Wood, who was the real projector of the railroad, and under which he was to construct the line, was illegal. The funds now in the hands of the Receiver were from the sale of the property to W. J. Sewell, of the West Jersey Railroad. He afterwards made a second sale of the property to Logan Bullitt and others of Philadelphia, who organized the South Jersey Railroad, which completed the line to Atlantic City and Cape May, and is now operating it to those towns.

Quaker City Elevated.—An action has begun in Philadelphia by the attorneys of this company and of the Northwestern Elevated Railroad, asking for decrees of dissolution for both corporations. This action is consequent upon the decision rendered by the Pennsylvania

Supreme Court in March declaring that the companies being incorporated under the general railroad law of the State have no authority to build an elevated structure in the city of Philadelphia. The action now is of course merely formal. When the decision was announced preparations were begun to wind up the affairs of the corporations, and the short section of elevated railroad built in Philadelphia was torn down. The present action is important only as finally indicating that the projectors, who are New York bankers, have given up all idea of appealing to the Pennsylvania legislature in an effort to secure favorable legislation for their projects.

South St. Paul Belt.—W. N. Coler & Co., stock brokers of New York, have begun a suit in the Supreme Court, Brooklyn, against the railroad company, Frank P. Blair, and the Pittsburgh Bridge Co. to enjoin them from negotiating or disposing of certain bonds, and to compel the railroad company to carry out a contract for the sale of the bonds to the plaintiffs.

Stewiacke & Lansdowne.—Lord Claude Hamilton and other trustees are suing the company for \$63,000 for the recovery of money advanced on this road together with accrued interest. The road was to connect with the Intercolonial at Brookfield and to run through the Stewiacke Valley to Lansdowne, Nova Scotia. One-third of it was graded and then the work stopped three years ago.

St. Louis, Kansas City & Colorado.—The railroad went into the hands of a receiver this week, when Judge Caldwell, of the United States Circuit Court, at St. Paul, Minn., appointed Adiel Sherwood as Receiver. He was formerly assistant attorney of the St. Louis & San Francisco. The St. Louis, Kansas City & Colorado road is part of the Atchison system, and extends from St. Louis to Union, 60 miles. The operation of the line has resulted in annual deficits of about \$100,000 for the past seven or eight years.

Toledo, Peoria & Western.—At the recent annual meeting changes were made in the Board of Directors, which give to the Pennsylvania and Chicago Burlington & Quincy Railroads, a majority of the Board. The control of the property was secured early in the year by the purchase of a majority of the stock by the Pennsylvania Railroad, which had been slowly acquiring stock for a number of years. The Pennsylvania then made an offer to the Chicago, Burlington & Quincy to share in the operation of the railroad with that company. The railroad extends across the State of Illinois, from the Indiana State line, where it connects with the Pennsylvania Lines through Peoria to the Mississippi River, where it connects with the Burlington road. It is said that the railroad west of Peoria will be operated directly by the Burlington and the portion east of that city by the Pennsylvania. The last annual report shows a deficit of \$50,000 on gross earnings of \$914,000. An agreement for the funding of the coupons of the bonds has been assented to by a majority of the bondholders. They agree to fund all the coupons maturing up to July 1, 1895, accepting \$5 in cash and the balance of interest stock.

Toledo, Ann Arbor & North Michigan.—A reorganization plan for this property was formulated this week by a committee consisting of George W. Murray, Thomas A. McIntyre, William H. Male, Joseph Richardson and Henry S. Redmond, of New York. It is proposed to have a new company issue \$7,000,000 50-year 5 per cent. bonds. Of these \$5,767,100 will be used to exchange for bonds of the present company, leaving \$1,232,900 for reorganization and future purposes. Now 5 per cent. non-cumulative preferred stock to the amount of \$2,850,000 will be issued for old bonds, accrued interest and for the cash assessment on the old stock. New common stock to the amount of \$6,500,000 will be exchanged for old stock upon the payment of \$5 cash a share. The exchange of new securities for the old divisional and consolidated bonds will be on a basis which it is asserted is equitable to the various liens. The annual fixed charges on the new mortgage bonds will be \$288,355, against \$420,670, the present fixed charges, an annual saving of \$132,315. The bonded debt for a mile of road under the plan will be \$2,045, against \$26,654 at present.

The publication of this plan started into activity other committees, representing conflicting interests of the company. Henry Clews, representing first mortgage divisional bondholders, and G. W. Quintard, Chairman of another committee, announces that his committee is preparing a plan of reorganization and security holders are requested not to assent to the present plan, pending the publication of this second plan.

Ulster & Delaware.—The annual report of the railroad for the year to June 30 shows gross earnings of \$428,052, a decrease of \$5,416; operating expenses, \$389,150, a decrease of \$3,759; net earnings, \$138,902, a decrease of \$1,657; other income, \$944, a decrease of \$4,32; charges, \$112,994, an increase of \$18,636. The total surplus is \$415, 32.

Winona & Southwestern.—This railroad was sold at Winona, Minn., on Sept. 15, by Receiver Tilden R. Selmes to Messrs. V. Simpson, H. W. Lambertson, M. G. Morton, for \$400,000. H. C. Truesdale, of the Farmers' Loan & Trust Co., of New York, interposed a protest to the sale of the property at that figure. The road extends from Winona to Osage, Ia., a distance of 117 miles. The rolling stock, machinery and shops were not included in the sale, being the property of the Winona & Southwestern Improvement Co.

TRAFFIC.

Traffic Notes.

Judge Williams, of the United States Circuit Court at Wichita, Kan., in the case of the United States against the Missouri Pacific Railroad, charged with discriminating against Wichita in freight rates has overruled a demurrer of the defendant as to the power of the prosecution to originate such a case without first having it passed upon by the Inter-State Commerce Commission. The Judge holds that a bill to enjoin can be filed by the United States District Attorney General, and that United States courts have original jurisdiction over the subject matter.

The American Line steamship Berlin arrived in New York about 24 hours late last week. In order to start her on the return trip on time the next day, the work of unloading and loading again was done in less than 21 hours. Two hundred men were employed continuously, excepting only time enough for luncheons. A very heavy cargo was discharged and 4,500 tons of freight and 1,000 tons of coal were loaded, besides the usual supplies and 750 passengers and their baggage.

The Freight Weighing and Inspection Bureaus do not make much noise in public nowadays, but it appears that they are still doing good work. The inspector at Toledo reports saving during the month of August, on changes of classification and rates, \$660; on platform weights, \$1,022;

on car-load weights, \$3,328; total, \$5,100, a decrease of \$253 from August, 1893.

It appears that the Southern railroads have compromised with the cotton shippers on the allowance to be made for compressing. It is reported from Atlanta that the allowance will be 8½ cents per 100 lbs., a reduction of 1½ cents instead of 3 cents as at first proposed.

Chicago Traffic Matters.

CHICAGO, Sept. 19, 1894. Eastbound shipments last week fully regained the loss of the preceding week, and closely approximated the tonnage of the corresponding week last year. Westbound shipments were well maintained. There are present no rumors of manipulations, and it is taken for granted that the eastern roads are sticking to their last good resolution. In the West, rates are generally well maintained, but the movement of merchandise is not encouraging. The country merchants are evidently planning to carry small stocks for some time to come.

Lake rates remained firm last week in spite of a light grain movement, and the general tendency was towards higher rates. Charters were reported at 1½ cents a bushel for wheat and 1¼ cents for corn to Buffalo. The vesselmen have been successful in carrying their point on coal rates from Cleveland. A few shippers are still holding out, but the majority are placing cargoes at 50 cents to Lake Superior ports. Rates on iron ore from Lake Superior points are steady and advancing.

No progress was made last week towards the formation of a transcontinental passenger association. The conference re-convened Monday, and is still in session. The Great Northern is represented by its Traffic Manager, notwithstanding its intimation that it would attend no more meetings until it had been granted the differential rate via Portland, which it demands.

The passenger committee of the Central Traffic Association has agreed upon rates for hunters to points in authorized territory in the South and Southwest on a basis of one and one-third the lowest first-class limited one-way rate to Cairo or St. Louis added to the rates from those points; to points in lower Michigan, one and one-third the lowest first-class limited one-way rate; to points in upper Michigan, Wisconsin and Minnesota, one and one-third the lowest first-class limited one-way rate to Mackinaw City or Chicago, plus the rates from those points; rates applicable via all legitimate routes.

The Texas lines have finally adopted an agreement to govern passenger business to that territory, which they think will insure the maintenance of southbound rates and round-trip rates, which have become seriously demoralized.

The Illinois Central has made a rate of \$13 from Chicago to New Orleans and Baton Rouge for laborers who may desire to avail themselves of work in that section. "Laborers'" rates to other points are also quoted as follows: Memphis, \$9; Greenville, \$11; Vicksburg, \$12. The rates are for parties of five traveling on one ticket.

The all-rail lines continued the excursion rate war from Indianapolis last week, the Big Four being the line selected to compete with the Lake Erie & Western.

The local and general contracting freight agents, and the local and general passenger agents having headquarters in this city, are to form a local society for social purposes and contemplate fitting up a club house.

The general freight committee of the Central Traffic Association gives notice of the restoration of iron rates to the tariff governed by the official classification, effective Oct. 1. The advance on manufactured iron between Pittsburgh and Chicago is from 15 cents to 17½ cents per 100 lbs. in carloads, and from 17½ cents to 20 cents per 100 lbs. in less than carloads.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending Sept. 15 amounted to 51,528 tons, against 44,183 tons during the preceding week, an increase of 7,345 tons and against 52,413 tons for the corresponding week last year. The proportions carried by each road were:

ROADS.	WEEK TO SEPT. 15.		WEEK TO SEPT. 8.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	4,540	8.8	3,565	8.1
Wabash.....	4,904	9.5	3,525	8.0
Lake Shore & Mich. Seuth..	4,397	8.5	4,525	10.2
Pitts., Ft. Wayne & Chicago.	5,883	11.4	4,821	10.9
Pitts., Cin., Chi. & St. Louis	7,078	13.7	6,212	14.1
Baltimore & Ohio.....	2,972	5.8	3,023	6.8
Chicago & Grand Trunk....	6,801	13.2	5,373	12.2
New York, Chic. & St. Louis	6,949	13.5	6,203	14.0
Chicago & Erie.....	6,498	12.6	5,258	11.9
C. C. & St. Louis.....	1,501	3.0	1,677	3.8
Totals.....	51,528	100.0	44,183	100.0

Of the above shipments 1,818 tons were flour, 17,560 tons grain and mill stuff, 11,015 tons cured meats, 9,758 tons dressed beef, 1,416 tons butter, 2,238 tons hides and 4,139 tons lumber. The three Vanderbilt lines carried 30.8 per cent., the two Pennsylvania lines 25.1 per cent., Lake lines carried 58,551 tons against 73,335 tons last week.

Railroads Don't Make All the Trouble.

Up to about three years ago the Canadian Pacific steamship line was master of all the Asiatic freight to and from Portland and Puget Sound. In those days it was simply a question of capacity of the steamers. If they had an abundance of merchandise, which brought a better revenue than flour, only a small quantity of flour was loaded and frequently large amounts of flour shipped from Portland to Vancouver, remained at the latter point fully a month, awaiting the next steamer. This raised a rumour among the shippers. Finally, through the Union Pacific, an opposition line was put on; then the Canadian Pacific at once reduced the rate from \$6 to \$4 per ton in Mexican silver and carried the flour to Hong Kong and Yokohama at a loss in order to kill the other line. These tactics won and when the Northern Pacific steamers began operation the Canadian tried the same methods; but it failed to push the new line to the wall as it was too heavily backed. As a result the Canadian has taken water and has consented to an increase on the flour rate to a basis of \$6, presumably Mexican silver.—Seattle Telegraph.

Minnesota Freight Rates.

The Minnesota Railroad and Warehouse Commission, which made an order last week to compel the Great Northern to reduce its rates on grain and mill stuff from the Red River Valley, an average of 15 per cent., later in the week issued one ordering a reduction in coal rates, by the Northern Pacific, from Duluth to Moorehead, Minn., from \$3.00 to \$2.25 per ton. Appeals will, it is understood, be taken by the railroads to the District Courts of the State.